IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF TEXAS

ERICK RODERICO PIVARAL GONZALEZ, Individually and as Special Administrator of the Estate of NEHEMIAS R. PIVARAL SANTOS, DECEASED, ERICK SANTOS and EVELYN MORENO	§ § § § § §	**Civil Action No. 3:22-CV-02714-K**
Plaintiffs	§ §	
V.	§ §	
CAYLEE ERIN SMITH & EASTMAN CHEMICAL COMPANY	§ § §	
Defendants.	§	

APPENDIX TO PLAINTIFFS' MOTION TO EXCLUDE CERTAIN EXPERT TESTIMONY AND BRIEF IN SUPPORT

Plaintiffs, Erick Roderico Pivaral Gonzalez, Erick Santos and Evelyn Moreno (collectively "Plaintiffs") files this Appendix to its motion to exclude certain expert testimony. Attached hereto are true and correct copies which are incorporated herein by reference for all purposes as follows:

Exhibit No.	Description	Appendix Number(s)
Exhibit A	Collision Reconstruction Engineering Report, by Paul Montalbano, dated 9/28/23.	App. 000001 – App. 000094
Exhibit B	Deposition Transcripts Volume 1 and Volume 2 of Paul Montalbano	App. 000095 – App. 000369
Exhibit C	True and Correct copy of circled and signed damage by Paul Montalbano	App. 000370 – App. 000371
Exhibit D	Deposition Transcript of Iris Dalley Graff, dated 12/14/23	App. 000372 – App. 000488
Exhibit E	Curriculum Vitae of Iris Dalley Graff	App. 000489 – App. 000498
Exhibit F	Scene Reconstruction Analysis Report by Iris Dalley	App. 000499 – App. 000545
Exhibit G	Photographs	App. 000546 – App. 000548

Dated: January 29, 2024

Respectfully submitted,

By: /s/ *Grant K. Schmidt*

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CERTIFICATE OF SERVICE

I, Grant K. Schmidt, do hereby certify that as an attorney of record for the Plaintiffs herein, that I have on this 29th day of January 2024, duly served the above and foregoing by electronic filing upon the following:

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EXHIBIT A

FOCUS
FORENSICS

COLLISION RECONSTRUCTION ENGINEERING REPORT

Regarding:

The Estate of Nehemias Roderico Pivaral Santos v. Caylee Erin Smith and Eastman Chemical Company
In United States District Court for the Northern District of Texas
Case No.: 3:22-CV-02714-K
Our File Number: 36-13811

Prepared for:
Eastman Chemical Company and Caylee Erin Smith

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September 28th, 2023

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INTRODUCTION

On Saturday, April 30th, 2022, at approximately 3:48 p.m., a single vehicle versus pedestrian collision occurred on northbound Interstate 45, just south of Bonner Avenue, in Angus, Navarro County, Texas. A 2011 Toyota Camry was parked, partially in the inside travel lane of northbound Interstate 45 due to a left front flat tire. The Toyota occupants were Ms. Evelyn Moreno (age 19), Mr. Nehemias Pivaral Santos (age 19), Ms. Dina Yamileth Regalado Soto (age 23), Mr. Melvin Alexander Diaz Fuentes (age 21), and Mr. Erick Jeremias Pivaral Santos (age 21). A 2021 Ford Explorer, driven by Ms. Caylee Erin Smith (age 23), was traveling northbound on Interstate 45 when it struck Mr. Nehemias Pivaral Santos, resulting in fatal injuries.

Paul J. Montalbano, P.E. of Focus Forensics was retained by Eastman Chemical Company on April 26th, 2023, to perform an independent collision reconstruction engineering analysis. This report will express the opinions and conclusions reached during the course of the collision reconstruction analysis, and the basis for these opinions and conclusions.

All opinions are expressed to a reasonable degree of engineering certainty based on the evidence in this case and the relevant application of reliable methods accepted within the collision reconstruction engineering community. This report is based on the information available to us at this time, as described in the Basis of Report section. Should additional information become available, we reserve the right to determine the impact, if any, of the new information on our opinions and conclusions.

OPINIONS AND CONCLUSIONS

1. The subject Toyota, originally driven by Ms. Evelyn Moreno, experienced a left front tire failure while traveling northbound on Interstate 45.
2. While a flat tire reduces the handling characteristics of a vehicle, it does not eliminate the ability to steer the vehicle off of the roadway, as evidenced by Ms. Evelyn Moreno's ability to come to a controlled final rest on the left side of the roadway. Steering to the right was equally possible.
3. There was more than sufficient space to fully vacate the travel lanes and park the 6-foot-wide Toyota either on the 7 to 8-foot wide inside paved shoulder, the 10 to 11 foot-wide outside paved shoulder, or the 50-foot-wide traversable grass shoulder.
4. Rather, Ms. Evelyn Moreno parked the Toyota still partially within the left travel lane, occupying approximately 2.1 feet (not accounting for the side mirror) of the 11.6-foot-wide inside northbound travel lane, providing approximately 9.5 feet of remaining available space for northbound traffic to pass the Toyota.
5. Given the Ford's width of approximately 6.6 feet, there was sufficient room for the Ford to pass the Toyota within the remaining available 9.5-foot width of the left lane. It was not necessary for the Ford to change lanes in order to pass the parked Toyota.
6. The Ford did not contact the Toyota.
7. The Ford contacted Mr. Nehemias Roderico Pivaral Santos's head while he was actively bending over, with his head extending beyond the parked Toyota, and into the inside northbound travel lane, approximately 1 foot into the path of the Ford.
8. The two tire marks photographed next to, or swerving away from the Toyota were *not* from the subject Ford Explorer, rather from a vehicle with smaller, thinner tires. The location and characteristics of these tire marks were indicative of one or more vehicles making an evasive swerving maneuver from left to right at the location of the parked Toyota.
9. There was no physical evidence or indication in the GPS data or the bearing data that the Ford was traveling or steered on or towards the left shoulder leading up to the incident location, as suggested by the plaintiff.
10. Regardless of the lateral position of the Ford at impact, Mr. Santos's head was extending *at least* 3.2 feet into the 11.6-foot-wide inside northbound travel lane, or *at least* 1.1 feet outboard of the right face of the parked Toyota, and directly into the path of northbound traffic; had Mr. Santos simply not bent over into the northbound travel lane, the incident would not have occurred.

11. Impact occurred between 3:48:51 to 3:48:52 p.m. Central Daylight Time (CDT). The last text message Ms. Smith sent was at 3:48:43 CDT, or approximately 8 to 9 seconds prior to the collision. At that point in time, Ms. Smith was between 1,022 to 1,146 feet from impact.

DISCUSSION

Police Report

According to the Texas Traffic Crash Report prepared by Officer Danielle Lee-Winston of the Richland Police Department, the collision occurred on northbound Interstate 45 near mile marker 223, in Angus, Navarro County, Texas, on April 30th, 2022, at approximately 3:51 p.m. Conditions were reported as daylight, clear and dry. The posted speed limit was listed as 75 mph. There was no construction or workers in the area at the time of the crash and the roadway was described as straight and level.

The VIN number for the 2021 Ford Explorer was listed as 1FMSK7DH7MGB01430 and was operated by Ms. Caylee Erin Smith (age 23). The VIN number for the 2011 Toyota Camry was listed as 4T4BF3EK8BR212323, with the following listed occupants:

1. Mr. Nehemias Roderico Pivaral Santos (age 19) – listed as pedestrian
2. Ms. Dina Yamileth Regalado Soto (age 23) – listed as back left seat occupant
3. Mr. Melvin Alexander Diaz Fuentes (age 21) – listed as back center seat occupant
4. Mr. Erick Jeremias Pivaral Santos (age 21) – listed as back right seat occupant

A not-to-scale police diagram generally documented the collision location (Figure 1).

Location

Astronomical records indicated that the sun was in the southwestern sky at an altitude of approximately 52 degrees, and an azimuth angle of approximately 252 degrees clockwise from due north (Figure 2). Historical weather reports indicated that there was no precipitation around the time of the collision, clear skies and approximately 86 degrees Fahrenheit. Sun and weather were not contributing factors to this collision event.

Interstate 45 in the area of the crash was a 6-lane divided highway generally running north and south, serving as a major thoroughfare between Houston and Dallas (Figure 3 to Figure 16). The incident occurred approximately 1.1 miles south of exit 225 (Bonner Avenue). Northbound Interstate 45 in the area of the incident was flat and level. The northbound approach was straight for approximately 0.33 miles prior to the incident. Approximately 0.5 miles prior to the incident, the northbound direction curved to the left by approximately 13 degrees over the course of approximately 0.17 miles (Figure 17), providing a straightaway to the accident location for approximately 1/3rd of a mile, or over 1500 feet. The speed limit was 75 mph for the area of the collision (Figure 18).

CAC Forensics, LLC photographed, measured and drone-mapped the scene of the collision on April 26, 2023, or approximately 1 year after the crash (Figure 19 to Figure 21). Based on historical Google aerials (Figure 22 to Figure 23), historical aerial flyover images (Figure 24) and historical Google Street View images (Figure 25 to Figure 41), the roadway was unchanged from the time of the collision to CAC's site inspection and mapping. Each direction consisted of three 11 to 12-foot-wide travel lanes, one 7 to 8-foot wide inside paved shoulder, and one 10 to 11-foot-wide outside paved shoulder with 50-foot-wide traversable grass shoulders. Each direction was separated by a 3.5-foot-tall median barrier wall. Because of the median barrier wall and curvature of the roadway to the left on the northbound approach, an unlimited sightline was not established for the inside northbound travel lane approach until approximately 1742 ft, or 0.33 miles prior to the incident location, or approximately 16 seconds at the speed limit of 75 mph, or approximately 13 seconds at a speed of approximately 90 mph.

Scene Evidence

Roadway physical evidence, final rest positions and body fluid was extensively documented from photographs taken on scene, body camera videos, post-incident investigation and historical aerial and street view documentation.

- At final rest, Mr. Nehemias Roderico Pivaral Santos's body was on top of the solid yellow line dividing the inside northbound through lane and left shoulder, with his head and torso on the inside shoulder, and his legs from the knees down within the inside northbound travel lane (Figure 42 to Figure 43). A blood trail from the right side of the inside northbound travel lane leading towards the shoulder and Mr. Nehemias Roderico Pivaral Santos's final rest indicated that Mr. Nehemias Roderico Pivaral Santos was moved from an initial rest position from within the inside northbound travel lane towards the shoulder, consistent with witness testimony. It was uncertain as to the exact orientation or position of Mr. Nehemias Roderico Pivaral Santos's initial rest position within the inside travel lane prior to being moved, however, it was generally located on the right half of the inside northbound travel lane, directly adjacent to the rear axle of the Toyota, or on top of the most northeastern blood mark.
- The Toyota had a flat left front tire, with the factory jack extended and located underneath the driver's door rocker panel (Figure 44 to Figure 45). The Toyota appeared to have been lunged forward by a few inches, tilting the extended jack forward. There was no lateral movement of the Toyota based on this evidence.

- A tire marking, consistent with rolling on a flat tire, was seen leading up to the Toyota's left front tire and was photographed to have originated from the inside northbound travel lane (Figure 46 to Figure 51). The tire mark continued from the inside northbound travel lane to the Toyota's rest position, with the Toyota partially on the shoulder and partially within the northbound travel lane. There was no lateral offset from the final rest position of the Toyota and the flat tire mark, indicating no lateral movement of the Toyota from impact.
- A faint swerving mark was visible, starting in the inside northbound travel lane, swerving to the right prior to the Toyota's rest position (Figure 52 to Figure 55).
- A secondary parallel swerving tire mark appeared, starting at the Toyota's right rear, located approximately 1 foot to the shoulder-side of the previously discussed swerve mark (Figure 56 to Figure 63).
- The tire mark closest to the shoulder consisted of *three* distinct tread grooves within the marking (Figure 64).
- The tire mark to the right of the 3-groove tire mark did not display distinct tread groove patterns within the mark but was of similar width.
- The Ford came to a controlled final rest approximately 520 feet north of the Toyota's parked position.

2021 Ford Explorer

Manufacturer specifications for the 2021 Ford Explorer (VIN: 1FMSK7DH7MGB01430) indicated an XLT trim with four doors, a 4-cylinder turbo-boosted gasoline engine and rear wheel drive. The overall length was 16.6 feet, overall width was 6.6 feet, overall height was 5.8 feet and wheelbase was 9.9 feet. The Ford's door-jam sticker indicated the standard tire size was 255/65R18, indicating 10-inch-wide tires. All four of the Ford's installed tires were 265/65R18, indicating the actual tire widths were approximately10.4-inches wide.

The Ford Explorer had localized and distinct contact damage to its left front corner and left side. All contact damage to the Ford was less than 4 feet in elevation.

- The only damage to the front face of the Ford was at the Ford's left front headlight, spanning in height from 3 to 3.5 feet from the ground (Figure 65). There was no front-face contact damage below 3 feet from the ground.

- There was a small, localized, and circular contact area to the left front corner of the hood of the Ford, just at and above the left front headlight (Figure 66 to Figure 69). The direct contact damage extended approximately 1 foot inboard from the left side of the Ford.
- The left front sheet metal fender was peeled out and crumpled rearward with visible blood and body matter on the inside and outside of the fender (Figure 70 to Figure 72).
- There was a gap of approximately 9.0 feet in contact evidence from the left front corner of the Ford to the left rear quarter panel of the Ford (Figure 73 to Figure 74). The left rear quarter panel of the Ford exhibited direct contact in the form of dents, scuffing and body matter transfer (Figure 75 to Figure 81).
- All tires of the Ford Explorer had *four* tread grooves within their tread width (Figure 82).

2011 Toyota Camry

Manufacturer specifications for the 2011 Toyota Camry indicated a base model, four-door, 4-cylinder gasoline engine and front wheel drive. The overall length was 15.8 feet, overall width was 6.0 feet, overall height was 4.8 feet and wheelbase was 9.1 feet.

The Toyota Camry had damage and body matter transfer on the rear bumper, rear trunk lid, right rear taillight, right rear quarter panel and right C-pillar, consistent with post-impact contact with from Mr. Nehemias Pivaral Santos's body (Figure 83 to Figure 87).

ANALYSIS

Flat Tire Response

The subject Toyota, originally driven by Ms. Evelyn Moreno, experienced a left front tire failure while traveling northbound on Interstate 45. While a flat tire reduces the handling characteristics of a vehicle, it does not eliminate the ability to steer the vehicle off of the roadway, as evidenced by Ms. Evelyn Moreno's ability to come to a controlled final rest on the left side of the roadway. Steering to the right was equally possible. There was more than sufficient space to fully vacate the travel lanes and park the 6-foot-wide Toyota either on the 7 to 8-foot wide inside paved shoulder, the 10 to 11 foot-wide outside paved shoulder, or the 50-foot-wide traversable grass shoulder.

Tire Mark Analysis

The subject Ford Explorer's tires consisted of *four* tread grooves (Figure 88), conclusively indicating the tire mark closest to the shoulder with *three* tread grooves was unrelated to the Ford's

movements. However, the tire mark to the right of the 3-groove tire mark did not display distinct tread groove patterns within the mark, requiring further analysis of its relevancy to the Ford's movements.

Photogrammetric Analysis

Photogrammetry is a well-known, peer-reviewed, highly validated engineering methodology used to reconstruct positional and measurement data from photographs and videos. There are various types of photogrammetric analysis, including graphical methods, scaling methods, photo-overlay or reverse projection, rectification and standard or traditional photogrammetry [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17].

Based on four different types of photogrammetric analysis performed (Figure 89 to Figure 113):

- The Toyota was occupying approximately 2.1 feet (not accounting for the side mirror) of the 11.6-foot-wide inside northbound travel lane, providing approximately 9.5 feet of remaining available space for northbound traffic to pass the Toyota.
- The tire mark with no discernable tread grooves was approximately 6.7 inches wide, with a known tolerance / accuracy of plus or minus 0.25 inches.

Relevancy of Tire Marks

The Ford was photo-scanned by CAC, LLC, providing a 3-dimensional point cloud with an average residual, or accuracy, of plus or minus 1/8th of an inch [18,19,20,21,22,23]. The width of the tread patch of the left side tires that physically contact the ground was measured to be approximately 8.4 inches wide (Figure 114 to Figure 117), or approximately 1.7 inches *wider* than the physical tire marks on the roadway. Therefore, the two tire marks photographed next to, or swerving away from, the Toyota were *not* from the subject Ford Explorer, rather from a vehicle with smaller, thinner tires. The location and characteristics of these tire marks were indicative of one or more vehicles making an evasive swerving maneuver from left to right at the location of the parked Toyota.

Diagrams

2-dimensional overhead diagrams were constructed, demonstrating the final rest positions and relevant physical evidence on the roadway reconstructed from Photogrammetry analysis (Figure 118 to Figure 121).

Impact Alignment

Contact matching is a critical component of accident reconstruction, whether it is aligning the damage of two vehicles, or aligning the damage between a vehicle and a human body, in order to determine the relative positions and/or orientations of the two objects at impact. The Ford exhibited localized circular contact damage to its left front headlight at elevation ranging from 3.0 to 3.5 feet from the ground and an inboard depth of approximately 1 foot, with no underlying elevated contact damage directly below it. The contact damage was circular in nature, with a contact radius consistent with the size of a head. There was blood and body fluids / matter within the round contact damage, specifically to the pointed leading edge of the left front fender of the Ford. There were pieces of skull and brain matter found on the roadway from Mr. Nehemias Roderico Pivaral Santos, consistent with the testimonial evidence that Mr. Nehemias Roderico Pivaral Santos was struck on the right side of the head by the Ford. Because all frontal contact damage to the Ford was exclusive to an elevation between 3.0 to 3.5 feet from the ground, with a lateral intrusion of approximately 1 foot, with no underlying damage to the front bumper below 3 feet in elevation, and because of the corresponding transfer onto the Ford's contact area, it was concluded that Mr. Nehemias Roderico Pivaral Santos was actively bending over at the time of impact, with *only* his head sticking out in front of the approaching Ford, with the right side of his head exposed to the oncoming Ford, and his body, torso and legs outside of the Ford's path. Had Mr. Nehemias Roderico Pivaral Santos been kneeling with his head vertically in line with his body, there would have been body to front bumper contact and resulting contact damage to the front bumper of the Ford below 3 feet in elevation. Additionally, Mr. Nehemias Roderico Pivaral Santos would have been thrown forward and likely been run over by the left side tires of the Ford if his body was inboard of the Ford's path. Instead, Mr. Nehemias Roderico Pivaral Santos was rotated and thrown diagonally away from the Ford, and subsequently struck the back right corner of the parked Toyota. Therefore, at impact, Mr. Nehemias Roderico Pivaral Santos was actively bending over with his head extended beyond his center of gravity, and his head extending outward of the parked Toyota, into the northbound travel lane, breaching the path of the Ford by approximately 1 foot. (Figure 122 to Figure 132). This was consistent with the testimony of Caylee Erin Smith and Erick Jeremias Pivaral Santos, both stating that Mr. Nehemias Roderico Pivaral Santos was in the process of bending over or picking something up at the time of impact.

Toyota Camry Tire Replacement

The owner's manual of the Toyota Camry indicated the removal of 3 items before getting access to the spare tire (Figure 133 to Figure 134):

1. Loosen and remove the retaining nut holding down the spare tire cover (carpeted pad).
2. Remove spare tire cover (carpeted pad covering spare tire).
    a. The jack handle and wheel nut wrench are located on the underside of the spare tire cover.
    b. The jack is located on the right side of the spare tire.
3. Loosen and remove bolt and spacer holding down spare tire.
4. Lift and remove spare tire.

Ford Digital Data

The airbag control module (ACM) of the Ford was imaged, however, because the contact with Mr. Nehemias Roderico Pivaral Santos did not meet the minimum change in speed requirement of 5 mph within a 150 millisecond time frame, it did not record any data, further corroborating that there was no contact with the Toyota.

The infotainment system of the Ford was imaged, providing gear shift data, call log data, track points and speed data for the day of the collision. The track point data contained GPS position and speed data at 1-second intervals, providing data for just shy of 40 miles of travel prior to impact (Figure 135 to Figure 139). The data indicated that the Ford was traveling up to approximately 90 mph leading up to impact, with a recorded speed reduction down to approximately 86 mph just prior to impact. Impact occurred between 2:48:51 to 2:48:52 p.m. Central Standard Time (CST) (Figure 140 to Figure 141), or between 3:48:51 to 3:48:52 p.m. Central Daylight Time (CDT).

The track point data from the infotainment system consisted of bearing data, providing the relative angle counterclockwise from due north in degrees (Figure 142 to Figure 146). The data was consistent with a parallel orientation with the roadway leading up to the collision location, followed by a 3-degree swerve to the right around the location of impact. There was no indication within the bearing data that the Ford drifted to the left shoulder prior to the incident. Additionally, there was no documented positional deviation from the left northbound travel lane towards the left shoulder in the GPS track point coordinates. While infotainment GPS data has been validated to be accurate within 3.5 to 7.5 feet [24,25,26], there was no observed lateral deviation in any of the data points prior to the incident location.

There was no physical evidence or indication in the GPS data or the bearing data that the Ford was traveling or steered on or towards the left shoulder leading up to the incident location, as suggested by the plaintiff.

Cell Phone Data

Ms. Smith's cell phone data was imaged, providing text records for the time leading up to the collision. The last text message Ms. Smith sent was at 3:48:43 CDT, or approximately 8 to 9 seconds prior to the collision. At that point in time, Ms. Smith was between 1,022 to 1,146 feet from impact.

Lateral Impact Location

Because the two visible swerve tire marks photographed were concluded to be unrelated to the subject Ford's movements, and because GPS track point data can have a tolerance of 3.5 to 7.5 feet, it was indeterminate as to the *precise* lateral location of the Ford and Mr. Santos at the time of impact. However, two versions were presented within the testimony and both were incorporated into the analysis framework to assist the jury in determining which version was more probable.

Plaintiff Theory of Impact Location

Plaintiff's theory indicated that the Ford drifted onto the left shoulder leading up to the impact location and implemented a swerve to the right, missing the Toyota by approximately "15 to 20 centimeters" [testimony of Mr. Erick Jeremias Pivaral Santos] or approximately 6 to 8 inches. Therefore, because the Toyota was approximately 2.1 feet into the travel lane, the left side of the Ford was no closer than approximately 2.6 feet from the yellow line when factoring in a 6-inch clearance, and Mr. Santos's head was at least 3.6 feet from the yellow line (given the 1-foot contact overlap). However, to be the most conservative and in favor for the plaintiff, the swerve angle away from the Toyota was accounted for when determining Mr. Santos's lateral head position at impact in order to allow for a 6-inch clearance between the Ford and the Toyota by the time the Ford reached the Toyota's position, after striking Mr. Santos's head, and accounting for the continued lateral movement of the Ford from its swerving movement from left to right. Implementing an emergency swerve from the left side shoulder at 86 to 90 mph would result in a maximum clockwise heading angle change of approximately 3.1 degrees clockwise from straight for the Ford [27,28]. When factoring in a 3.1-degree heading angle for the Ford from Mr. Santos's head contact to the right rear corner of the Toyota, the left front corner of the Ford could have been no closer than

approximately 2.2 feet from the solid yellow line at impact in order to provide at least 6 inches of clearance by the time in reached the parked position of the Toyota (accounting for its 3.1-degree swerve to the right). Therefore, Mr. Santos's head was *at least* 3.2 feet into the northbound travel lane (Figure 147), or *at least* 1.1 feet outboard of the right face of the parked Toyota at impact, based on plaintiff's theory of impact location. Even under plaintiff's theory, had Mr. Santos not bent over into the travel lanes outboard of the parked position of the Toyota, the collision would not have occurred.

Defense Theory of Impact Location

Ms. Smith testified, "…I scooted over enough in my own lane to miss the vehicle", but she did not think she entered the middle travel lane. Modeling her lateral position to the right side of her travel lane, consistent with the GPS-indicated lateral position of the Ford, placed the left side of the Ford approximately 4.0 feet away from the yellow line (Figure 148). Because Mr. Santos's head was located approximately 1 foot inboard from the left side of the Ford at contact, then under this scenario, Mr. Santos's head was located approximately 5.0 feet into the 11.6-foot wide inside travel lane at impact, or approximately 2.9 feet beyond the right side of the parked Toyota. Had Mr. Santos not bent over into the travel lanes outboard of the parked position of the Toyota, the collision would not have occurred.

Avoidance

Contact overlap was only approximately 1 foot inboard of the Ford's path, so had either party moved laterally away from one another by 1 foot, the collision would have been avoided. Therefore, had the Ford driver swerved a foot farther to the right, the collision would have been avoided, however, it was indeterminate as to how much advanced notice Ms. Smith was provided of Mr. Nehemias Roderico Pivaral Santos actively bending over into her path. Conversely, had Mr. Nehemias Roderico Pivaral Santos simply not bent over with his head outboard of the parked Toyota's right side, then the collision would not have occurred, regardless of where the Ford was. In other words, regardless of the lateral position of the Ford at impact, had Mr. Santos simply not bent over into the northbound travel lane, the incident would not have occurred.

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23) Vinje, M., "Evaluating Apple's Integrated LiDAR devise for Indoor 3D Modelling," Master's Thesis in Ingeniørvitenskap & IKT, 2021.

24) Bortles, W., McDonough, S., Smith, C., Stogsdill, M., "An Introduction to the Forensic Acquisition of Passenger Vehicle Infotainment and Telematics Systems Data." SAE Technical Paper 2017-01-1437, 2017.

25) Vandiver, W., Anderson, R., "Analysis of Berla iVe Acquisitions of Vehicle Speed Data from Ford Sync Systems," SAE Technical Paper 2018-01-1442, 2018.

26) Vandiver, W., Anderson, R., "Analysis of Vehicle GPS and Derived Speed Data from Ford Sync Generation 3, Version 2 Systems Acquired with Berla iVe," SAE Technical Paper 2021-01-0903, 2021.

27) Muttart, J., "Influence of Age, Secondary Task and Other Factors on Drivers' Swerving Responses before Crash or Near-Crash Events," SAE Technical Paper 2015-01-1417, 2015.

28) Leakkaw, P., Panichpapiboon, S., "Real-Time Vehicle Maneuvering Detection with Digital Compass," IEEE Access 2021.3097752, 2021.

29) Muttart, J., "Development and Evaluation of Driver Response Time Predictors Based upon Meta Analysis," SAE Technical Paper 2003-01-0885, 2003.

30) Muttart, J., "Quantifying Driver Response Times Based Upon Research and Real Life Data," Proceedings in the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, 2005.

31) Toxopeus, R., Atalla, S., Kodsi, S., Oliver, M., "Driver Response Time to Midblock Crossing Pedestrians," SAE Technical Paper 2018-01-0514, 2018.

BASIS OF REPORT

1. Texas Crash Report 2200089, Texas Incident Report 2200089, emailed witness statement from Caylee Smith to Corporal Lee-Winston and five 911 calls.
2. Police photographs and videos
    a. 57 scene photographs
    b. 10 Ford Explorer photographs
    c. 18 body camera / dash camera videos of first responders
3. Inspection photographs and videos
    a. 297 Ford Explorer photographs from Axiom taken on 09/06/2022
    b. 401 Ford Explorer photographs from CAC taken on 09/06/2022
    c. 461 site inspection photographs and 4 drive through videos from CAC taken on 04/26/2023
    d. 476 Toyota Camry photographs from CAC taken on 06/22/2023
4. Miscellaneous photographs
    a. 13 photographs of Mr. Nehemias Pivaral Santos.
5. CDR and Infotainment system download data for the Ford Explorer.
6. Ms. Smith cell phone text records.
7. CDR download data for the Toyota Camry.
8. Aperture report dated July 10th, 2023.
9. Deposition transcripts:
    a. Dina Yamileth Regalado Soto
    b. Erick Jeremias Pivaral Santos
    c. Erick Jeremias Pivaral Santos
    d. Evelyn Moreno
    e. Melvin Alexander Diaz Fuentes
    f. Caylee Erin Smith
10. Published historical maps, satellite aerial, flyover aerial and street view images of the incident location.
11. Published astronomical and meteorological data for the day of the crash.
12. Manufacturer specifications and dimensional data for the 2021 Ford Explorer and 2011 Toyota Camry.

13. Owner's manual for the 2011 Toyota Camry.
14. Publications listed under Citation section of this report.

ATTACHMENTS

1. Police Diagram, not-to-scale (Figure 1)
2. Scene / Location Images (Figure 2 to Figure 64)
3. Ford Explorer (Figure 65 to Figure 82).
4. Toyota Camry (Figure 83 to Figure 87).
5. Analysis and diagrams (Figure 88 to Figure 148).
6. Curriculum Vitae and Testimony History List for Paul J. Montalbano. P.E.

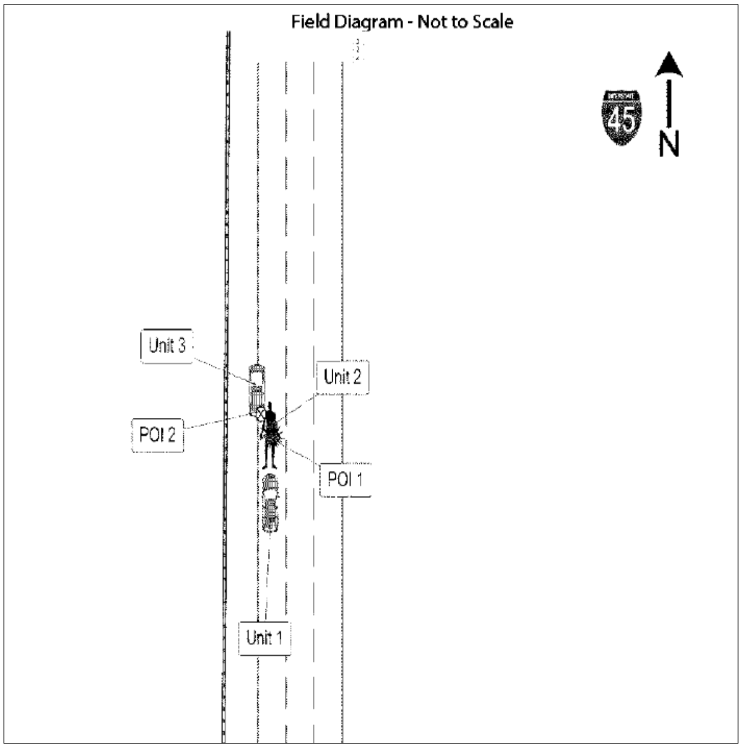

Figure 1: Not-to-scale police diagram.

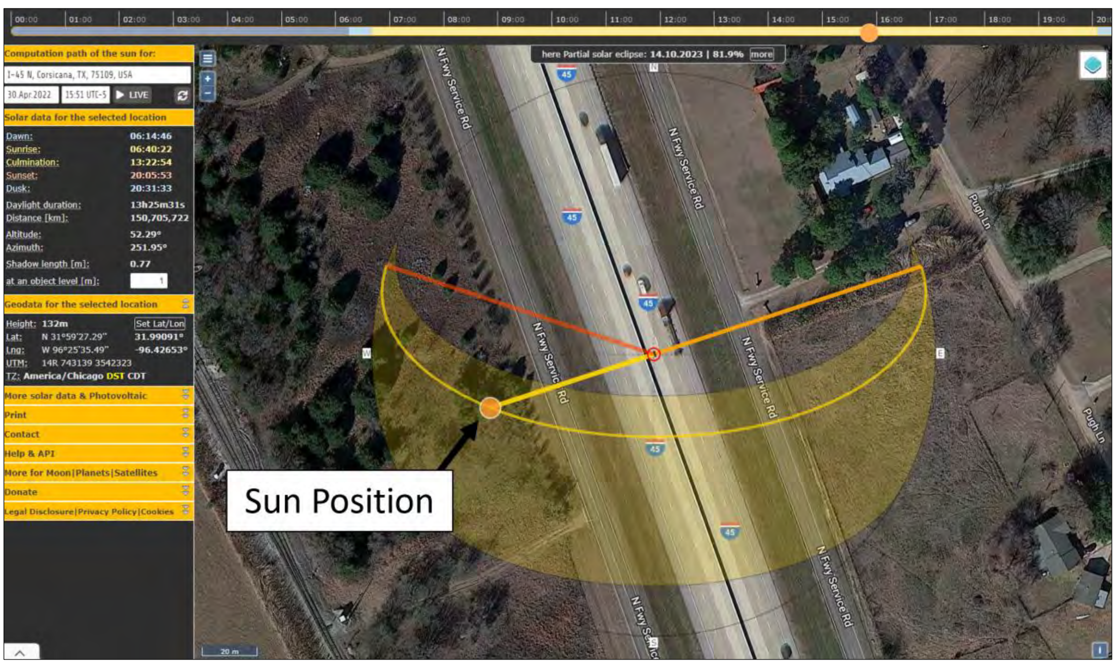

Figure 2: Sun position at time of collision.

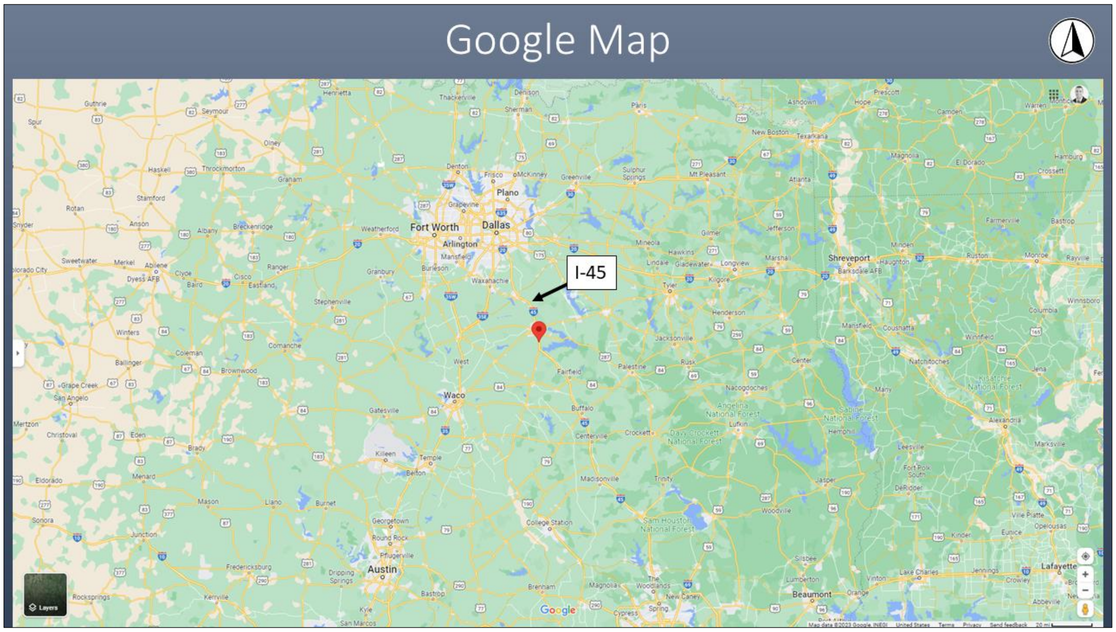

Figure 3: Google map.

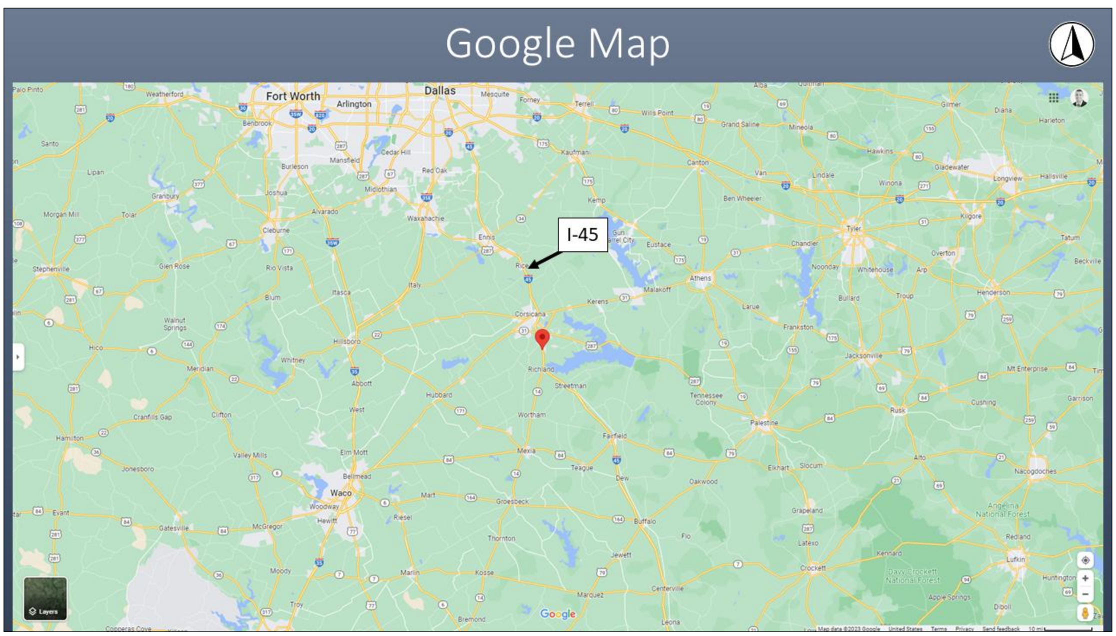

Figure 4: Google map.

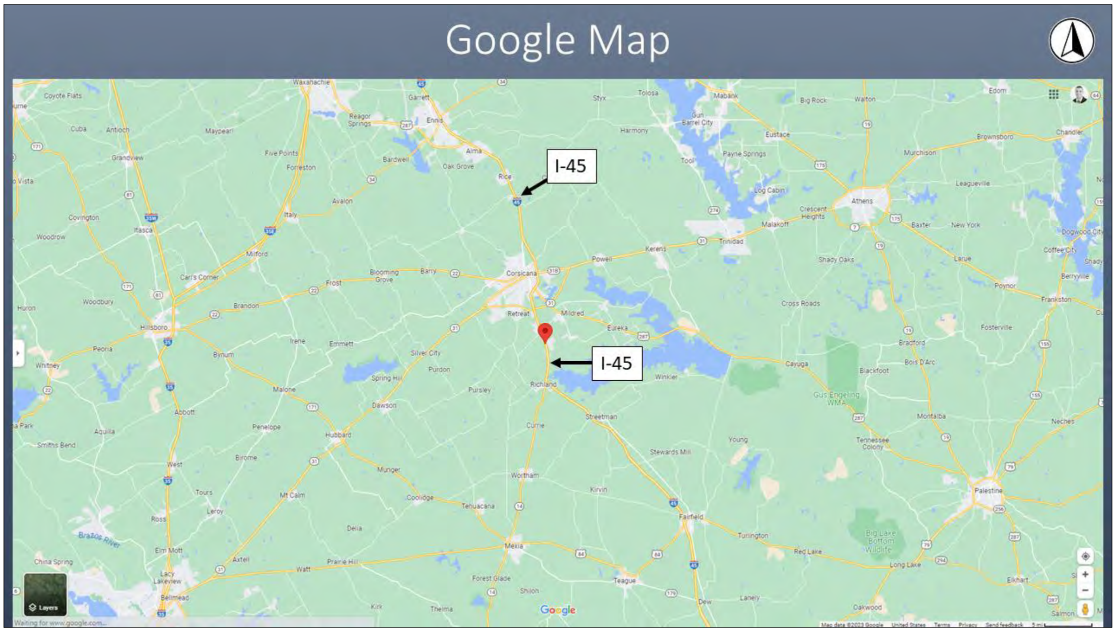

Figure 5: Google map.

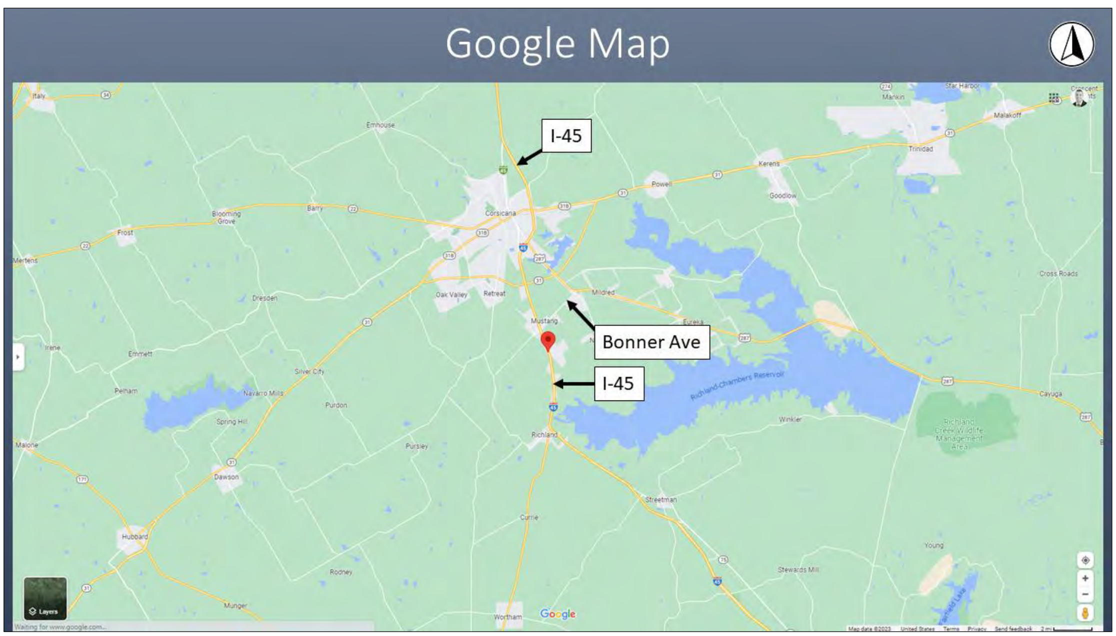

Figure 6: Google map.

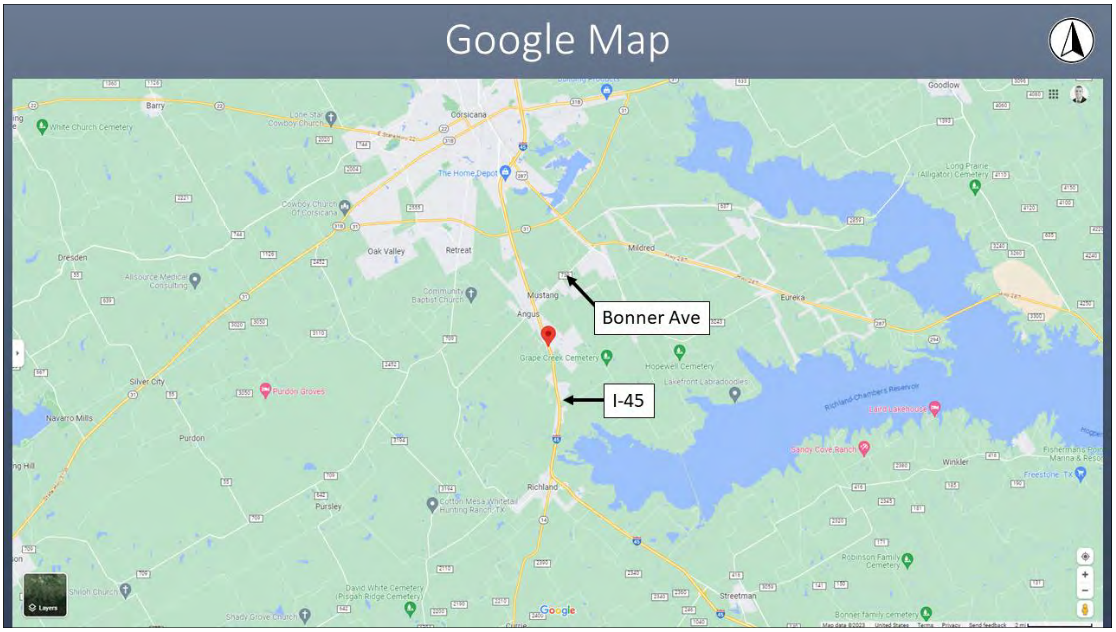

Figure 7: Google map.

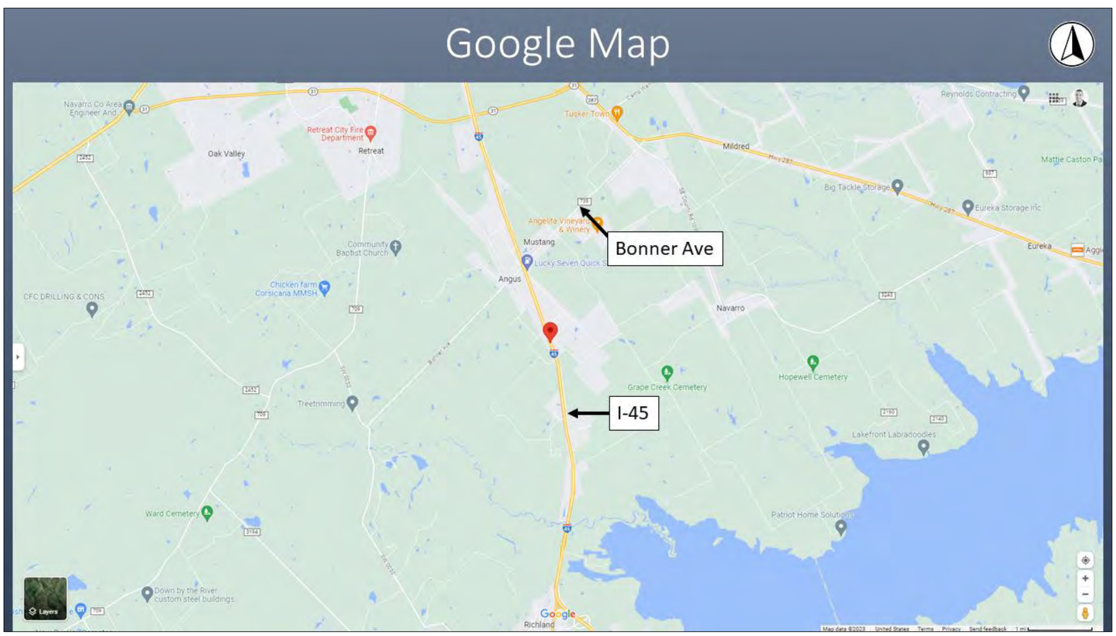

Figure 8: Google map.

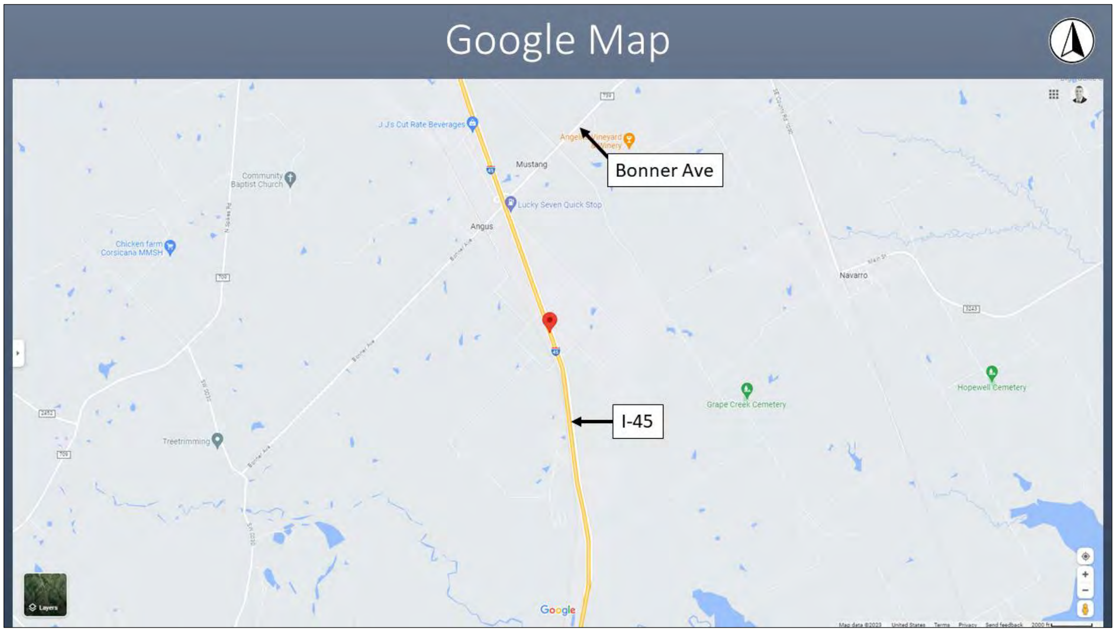

Figure 9: Google map.

Figure 10: Google aerial.

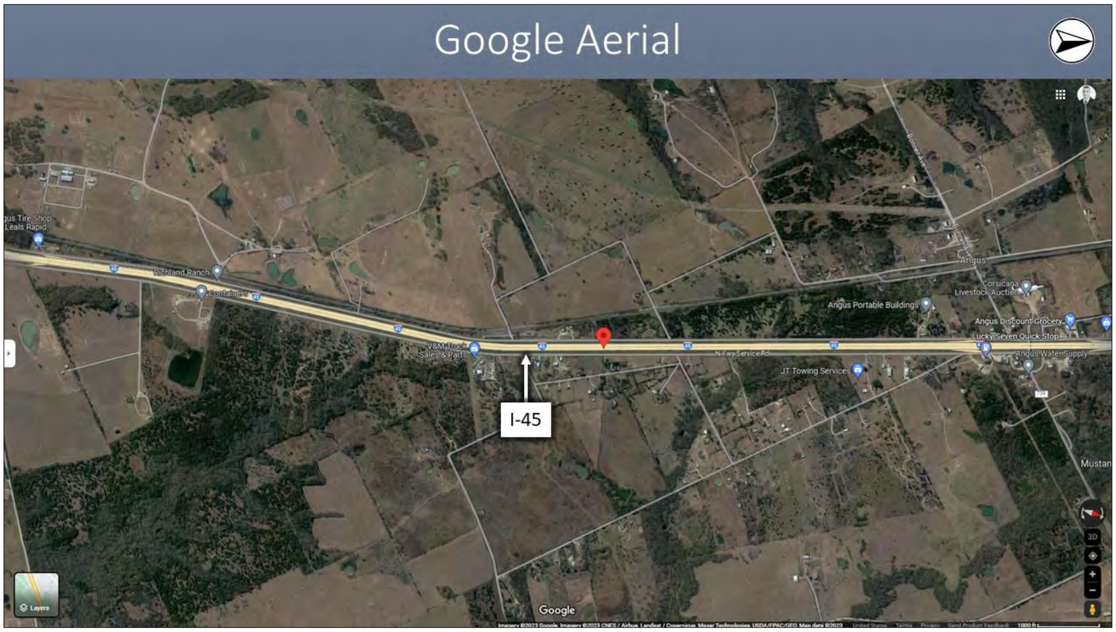

Figure 11: Google aerial.

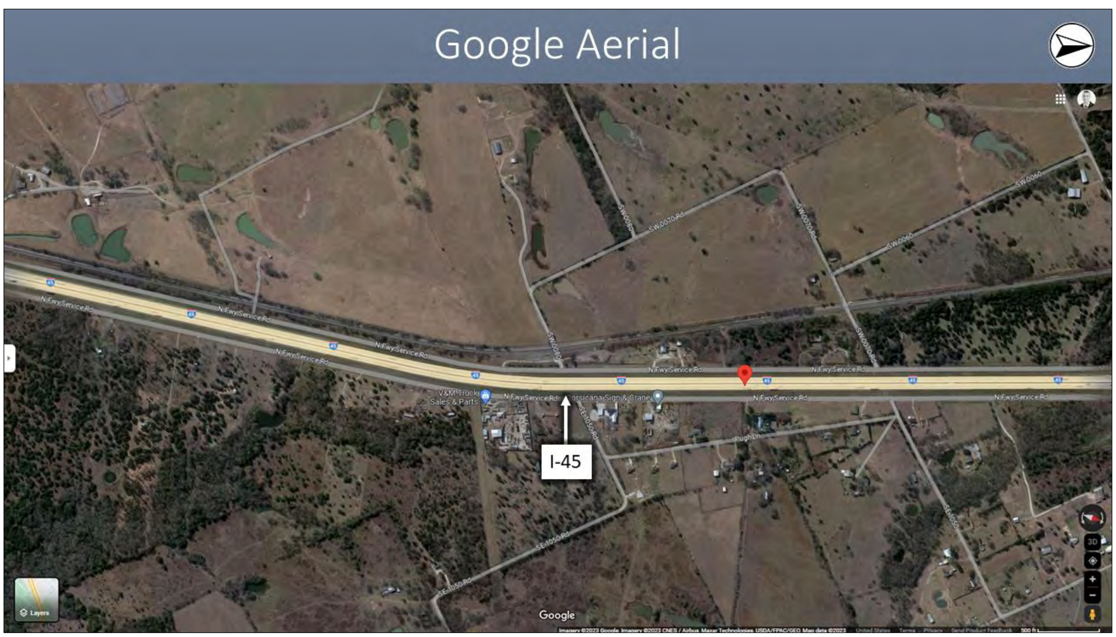

Figure 12: Google aerial.

Figure 13: Google aerial.

Figure 14: Google aerial.

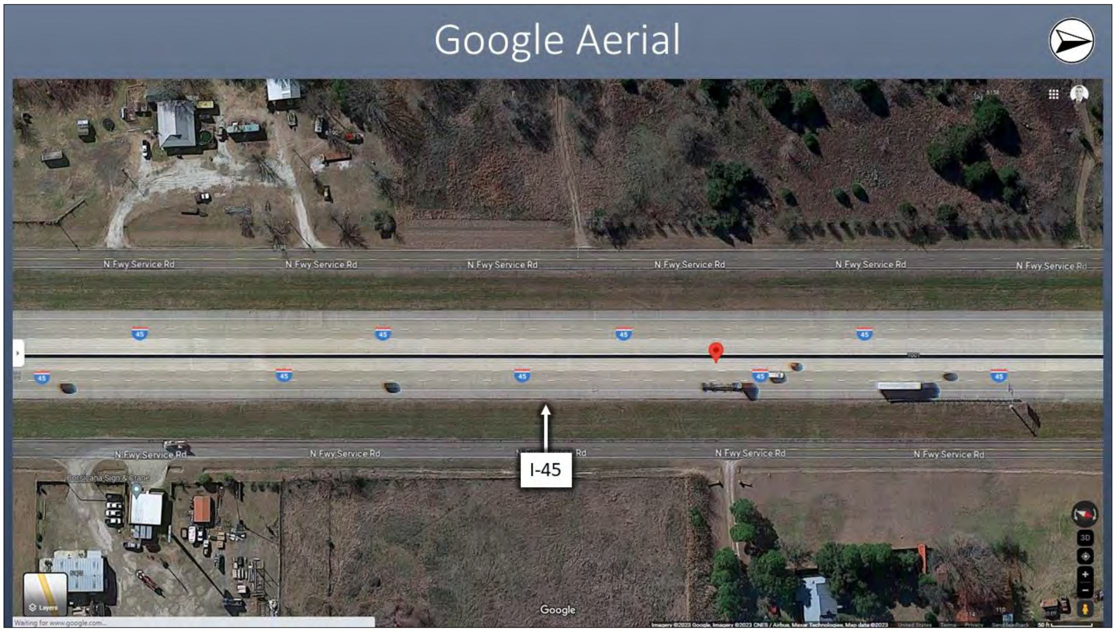

Figure 15: Google aerial.

Figure 16: Google aerial.

Figure 17: Roadway curvature.

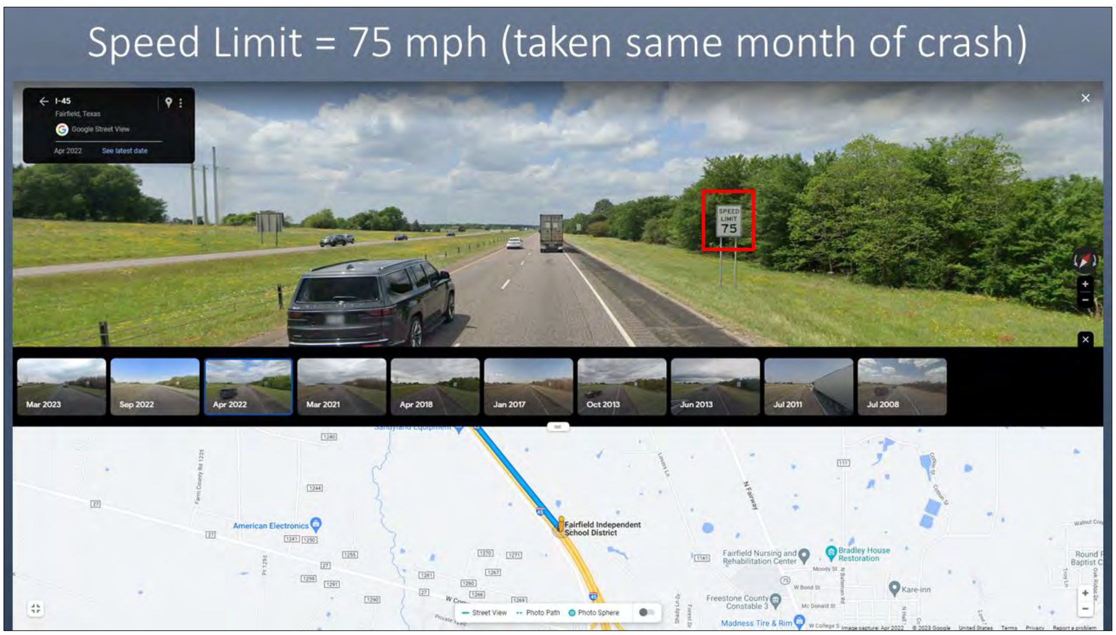

Figure 18: Speed limit 75 mph.

Figure 19: CAC site inspection photograph taken on 04/26/2023.

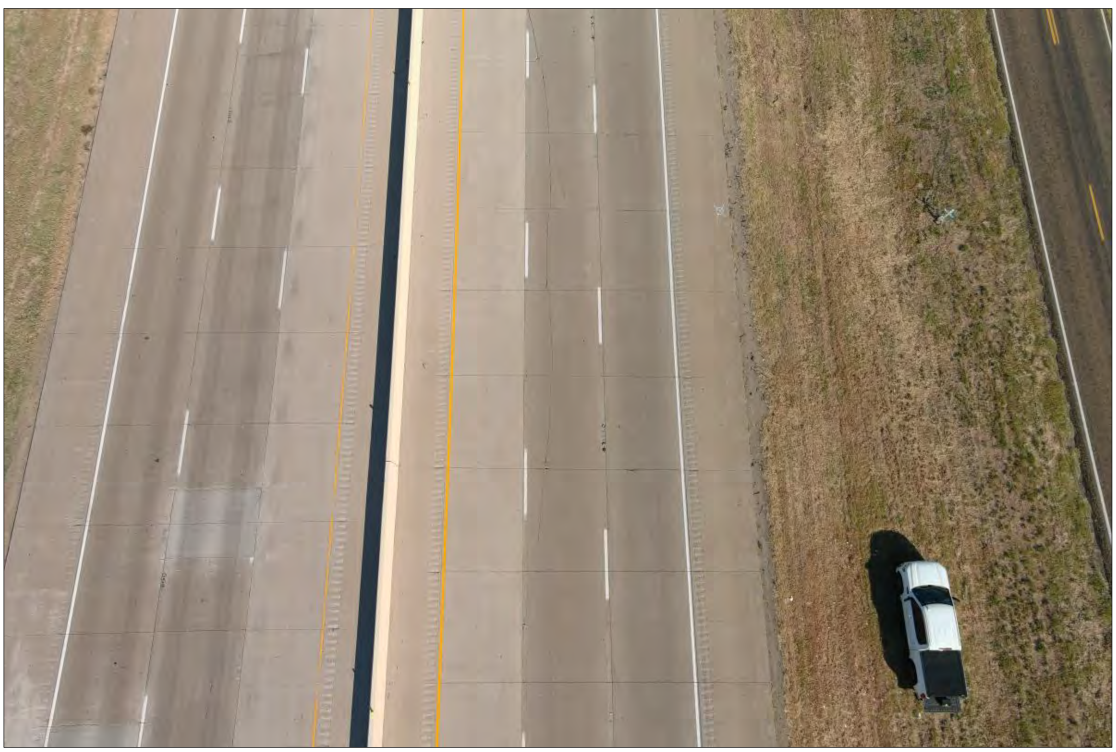

Figure 20: CAC site inspection photograph taken on 04/26/2023.

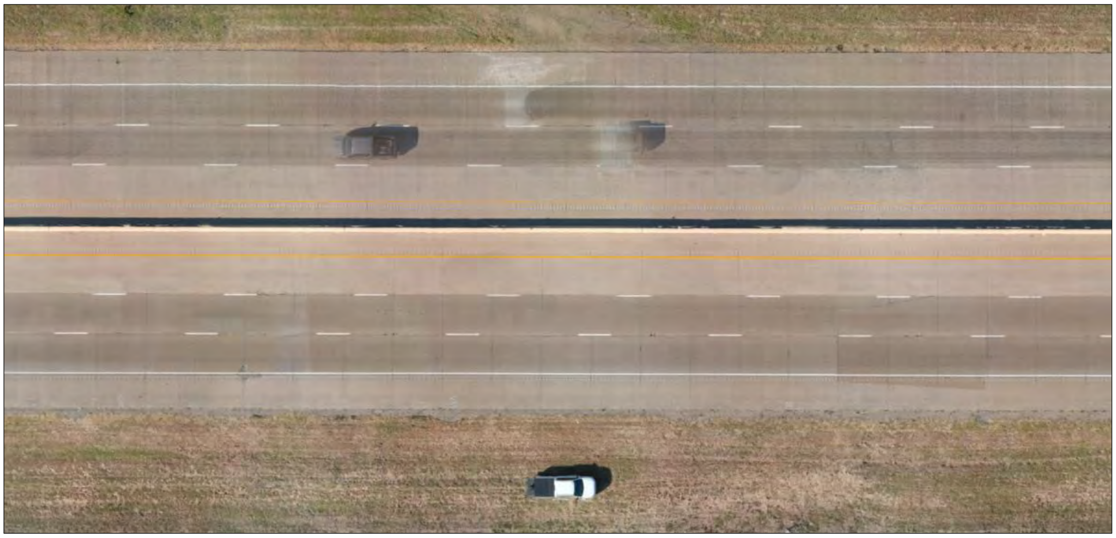

Figure 21: CAC site inspection drone mapping performed on 04/26/2023.

Figure 22: Historical Google Aerial dated January of 2022.

Figure 23: Historical Google Aerial dated June of 2022.

Figure 24: Historical aerial flyover image taken on 11/28/2022.

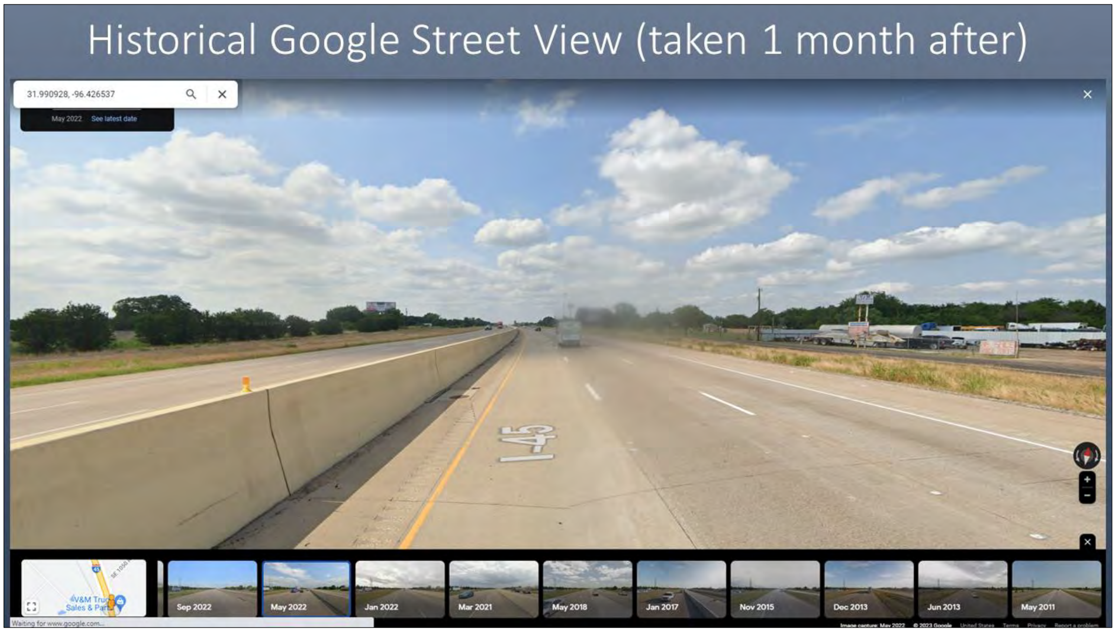

Figure 25: Historical Google Street View taken 1 month after crash.

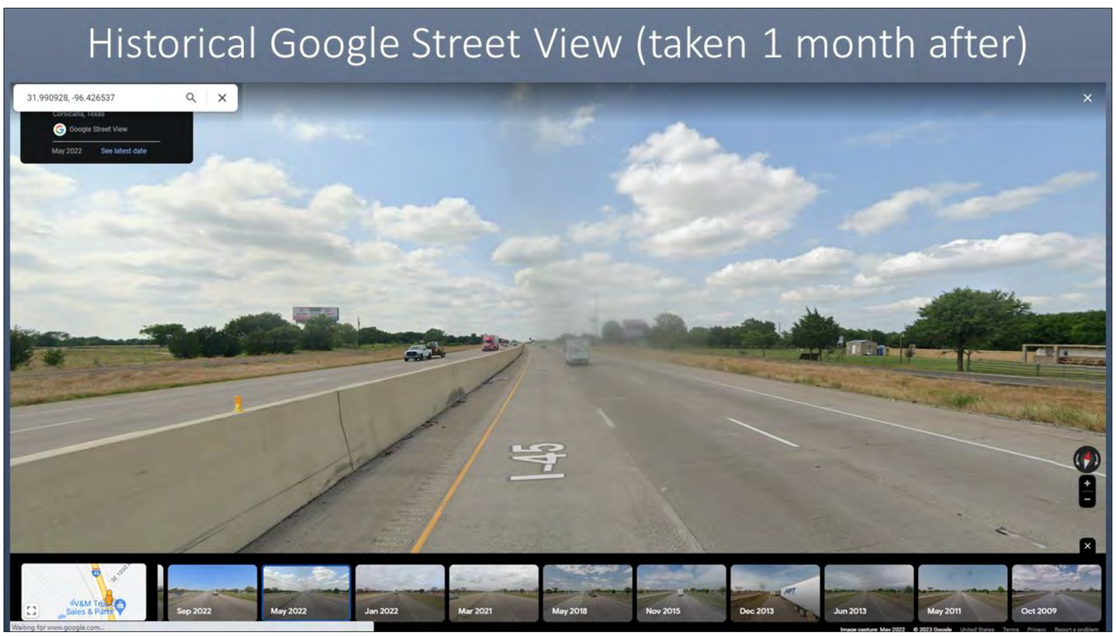

Figure 26: Historical Google Street View taken 1 month after crash.

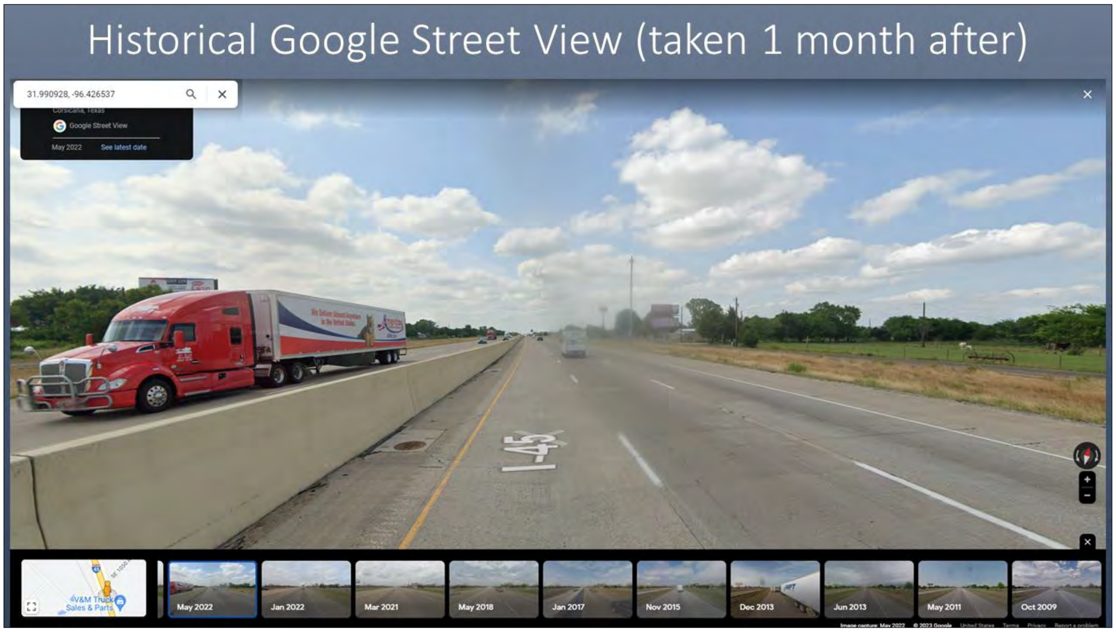

Figure 27: Historical Google Street View taken 1 month after crash.

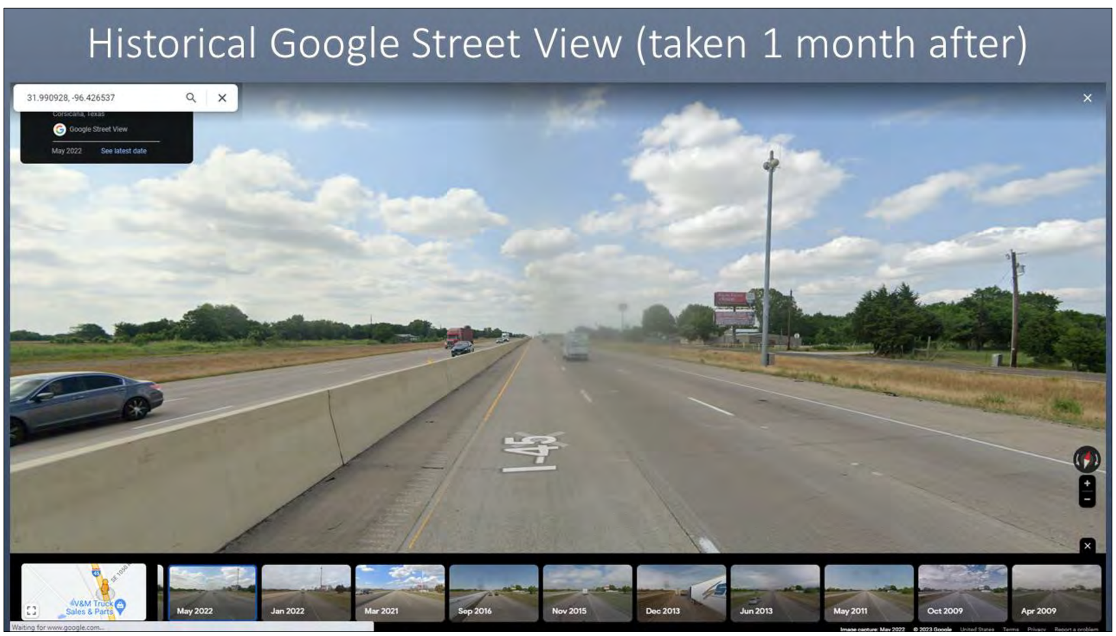

Figure 28: Historical Google Street View taken 1 month after crash.

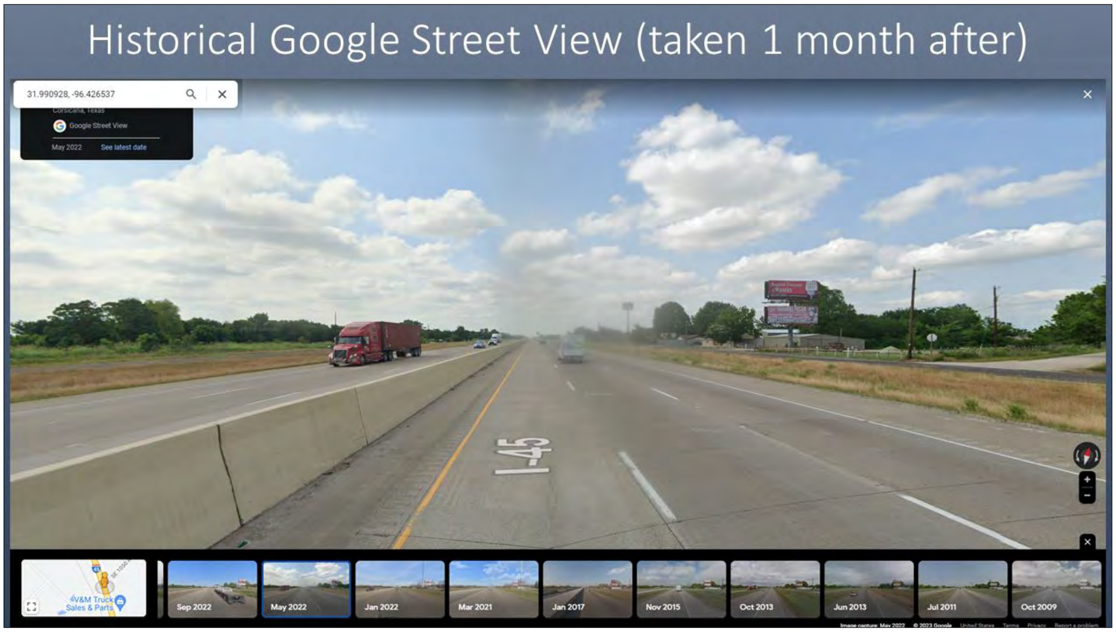

Figure 29: Historical Google Street View taken 1 month after crash.

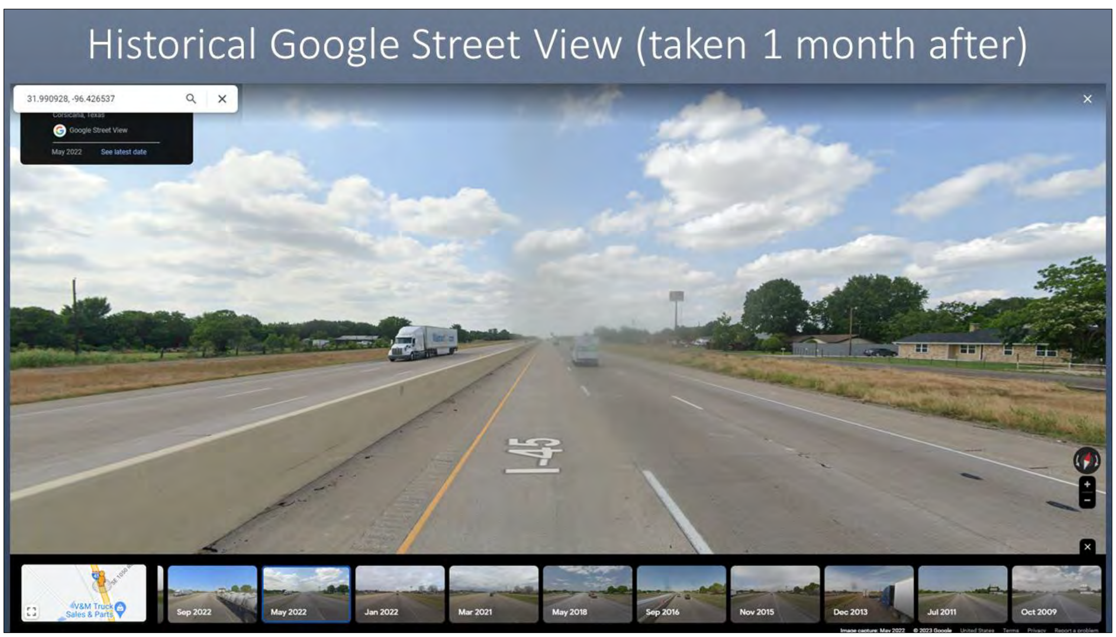

Figure 30: Historical Google Street View taken 1 month after crash.

Figure 31: Historical Google Street View taken 1 month after crash.

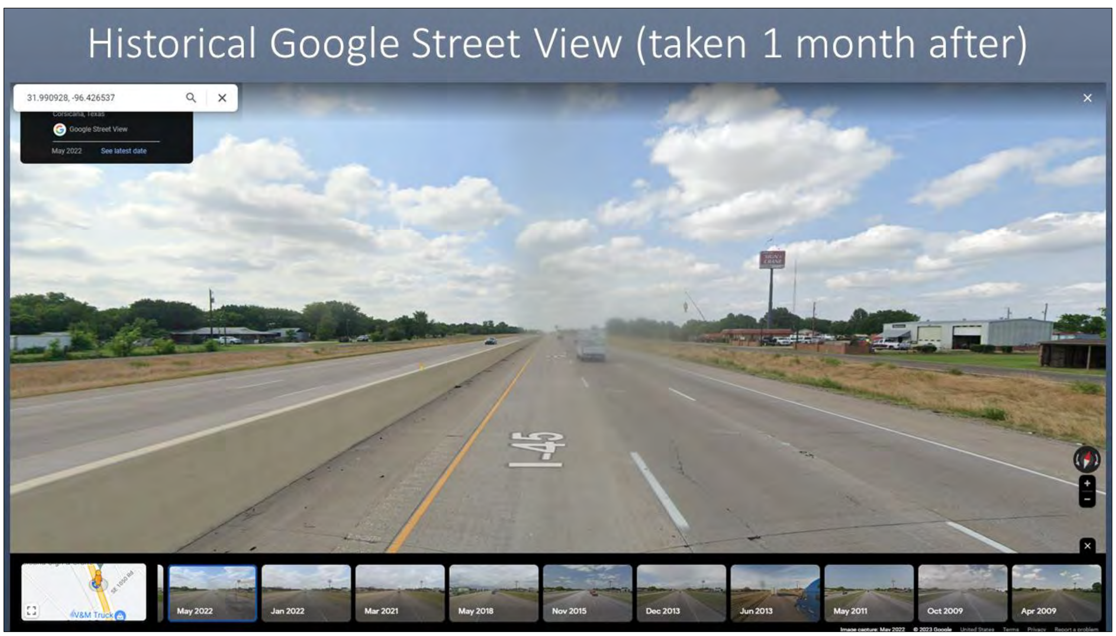

Figure 32: Historical Google Street View taken 1 month after crash.

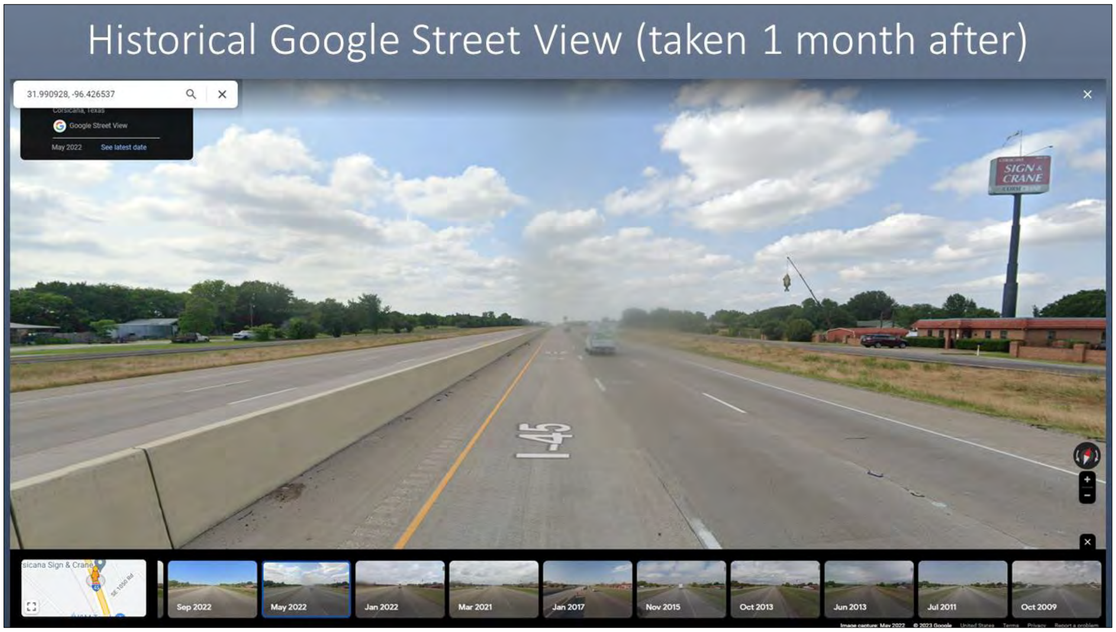

Figure 33: Historical Google Street View taken 1 month after crash.

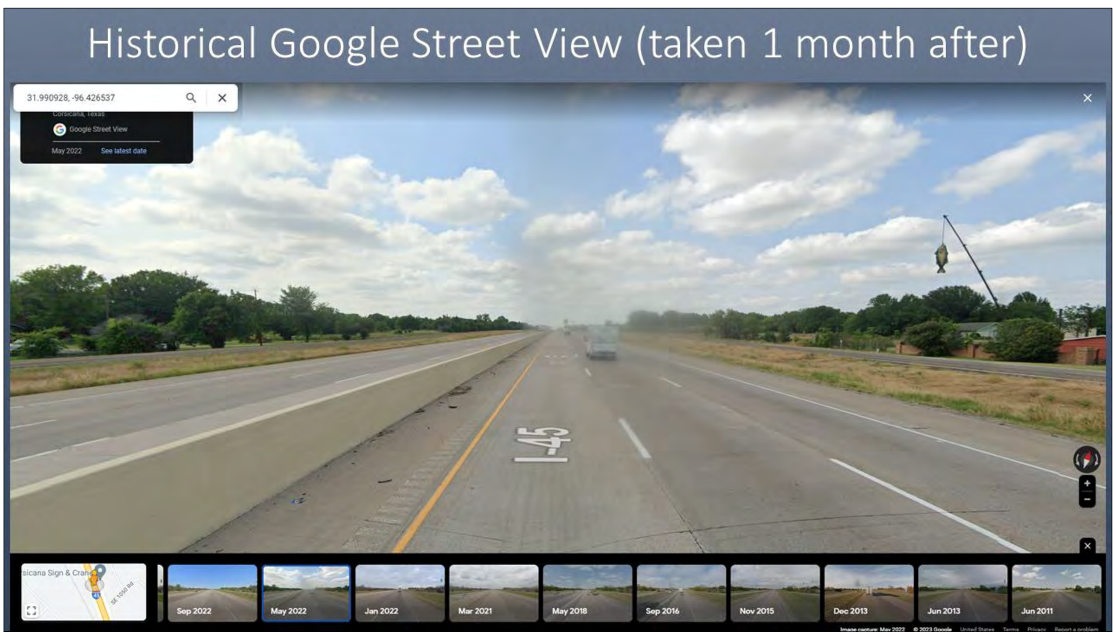

Figure 34: Historical Google Street View taken 1 month after crash.

Figure 35: Historical Google Street View taken 1 month after crash.

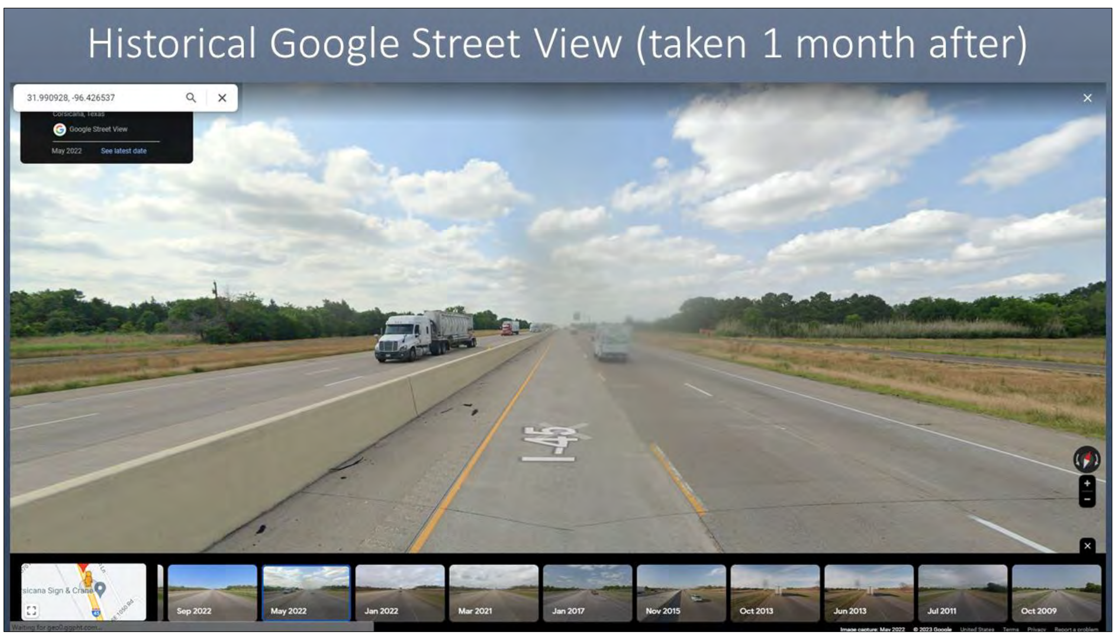

Figure 36: Historical Google Street View taken 1 month after crash.

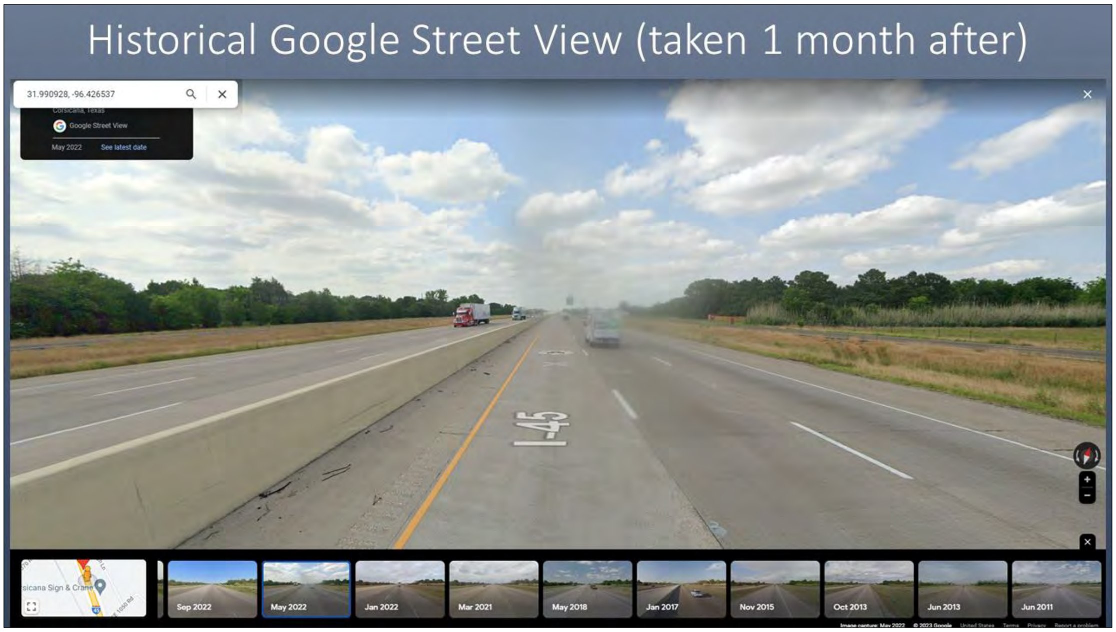

Figure 37: Historical Google Street View taken 1 month after crash.

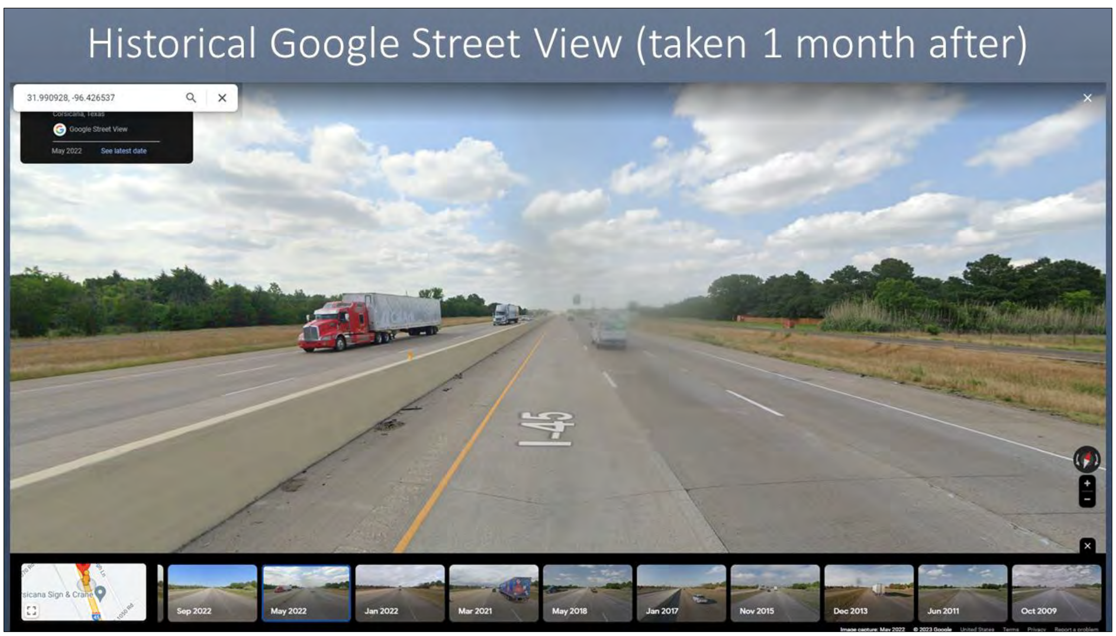

Figure 38: Historical Google Street View taken 1 month after crash.

Figure 39: Historical Google Street View taken 1 month after crash.

Figure 40: Historical Google Street View taken 1 month after crash.

Figure 41: Historical Google Street View taken 1 month after crash.

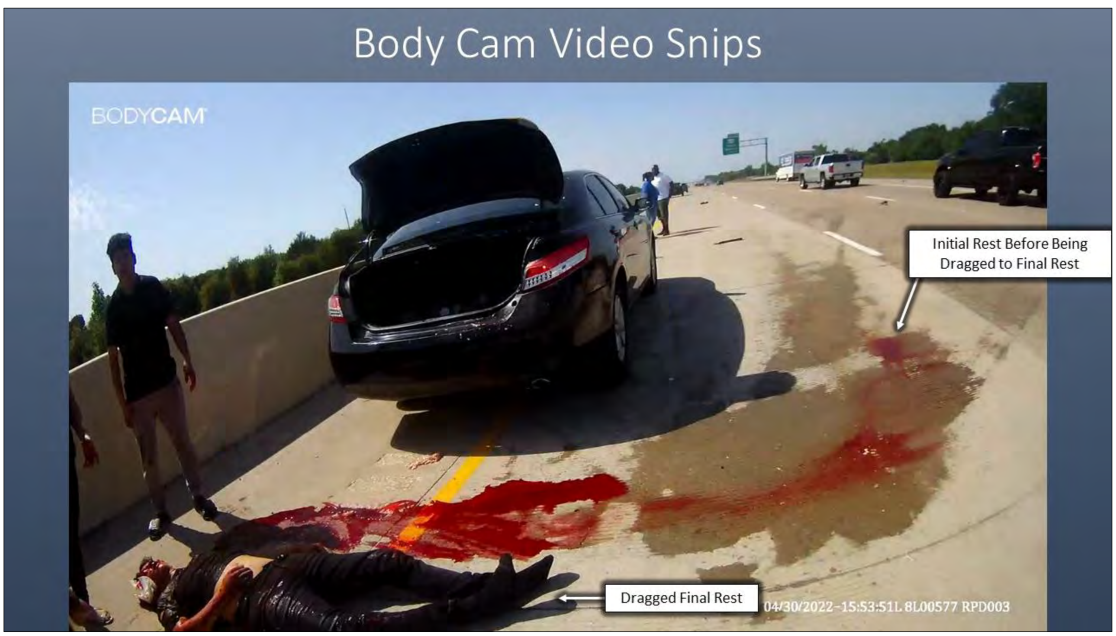

Figure 42: Body camera snips.

Figure 43: Body camera snips.

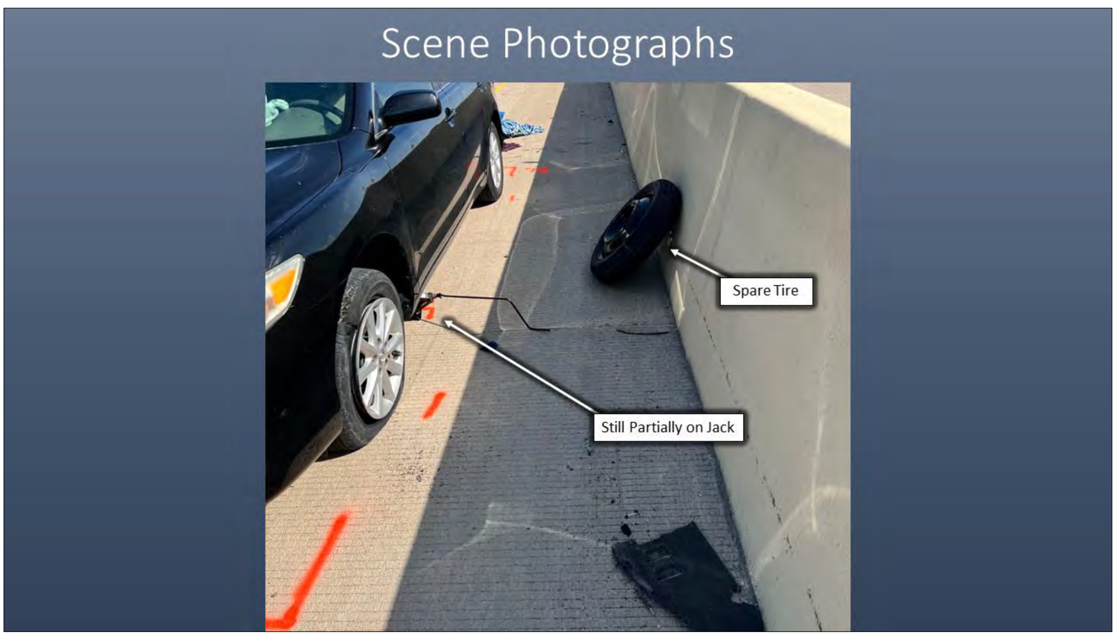

Figure 44: Police photographs.

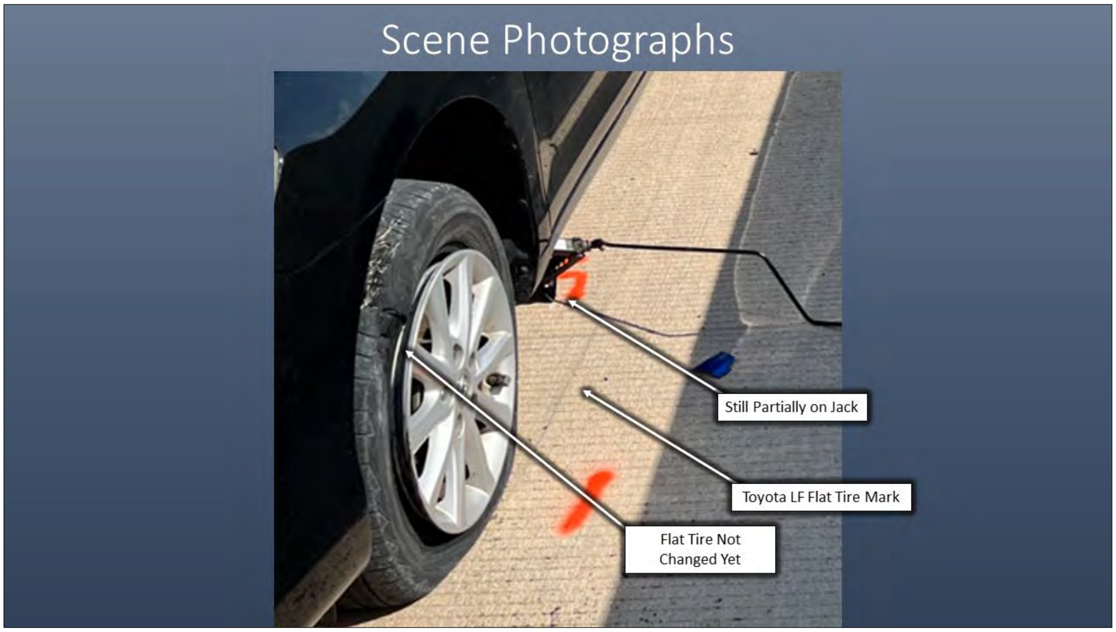

Figure 45: Police photographs.

Figure 46: Police photographs.

Figure 47: Police photographs.

Figure 48: Police photographs.

Figure 49: Start of officer marked Toyota left front tire mark.

Figure 50: Police photographs.

Figure 51: Police photographs.

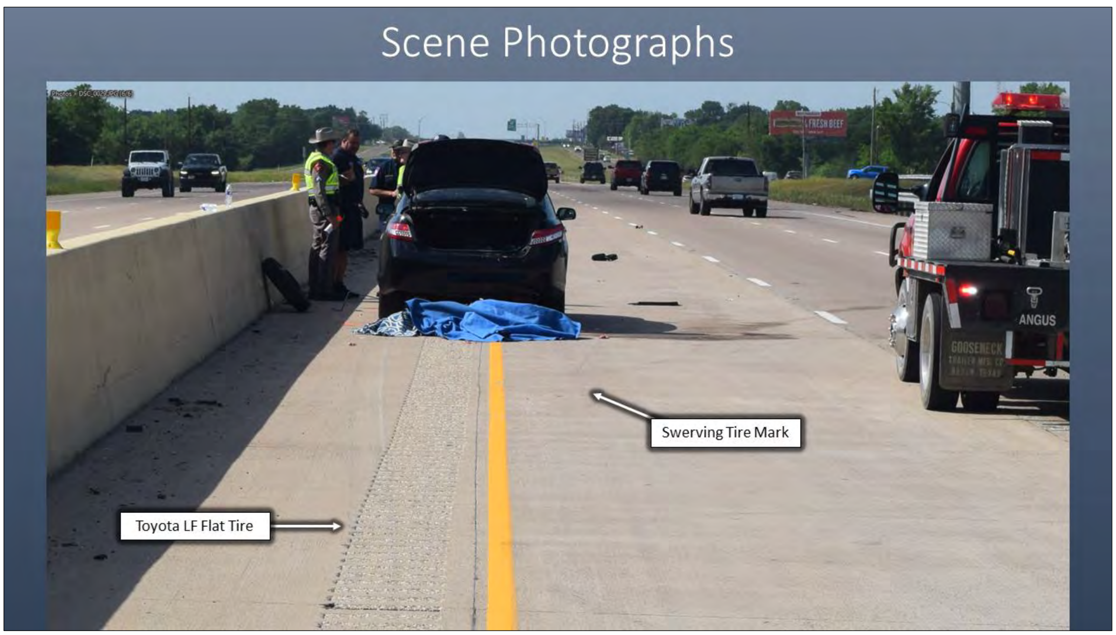

Figure 52: Police photographs.

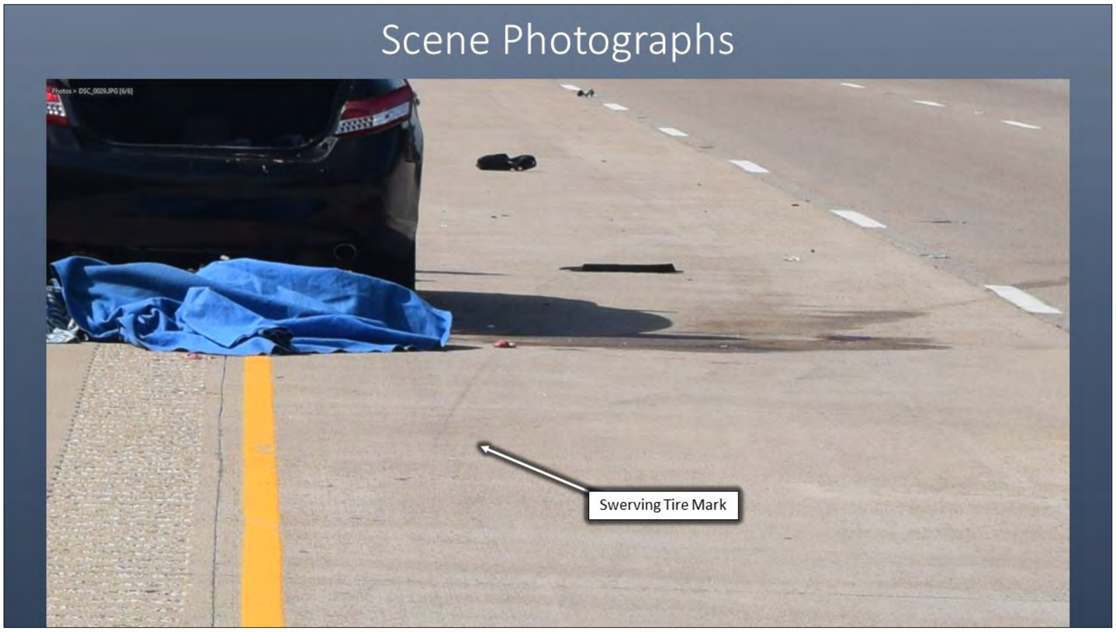

Figure 53: Police photographs.

Figure 54: Police photographs.

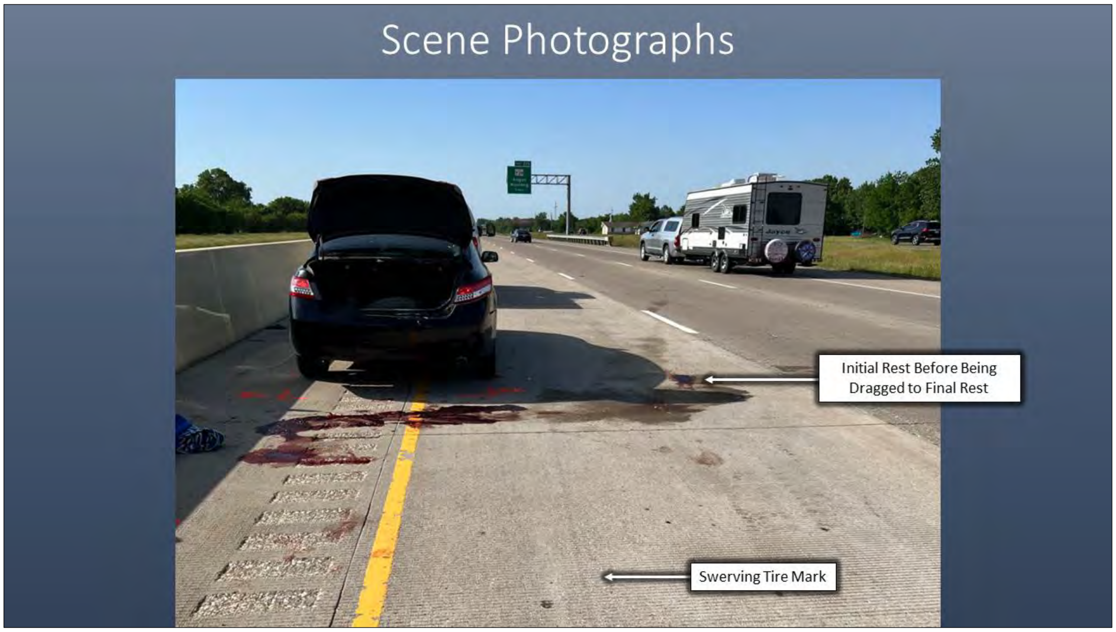

Figure 55: Police photographs.

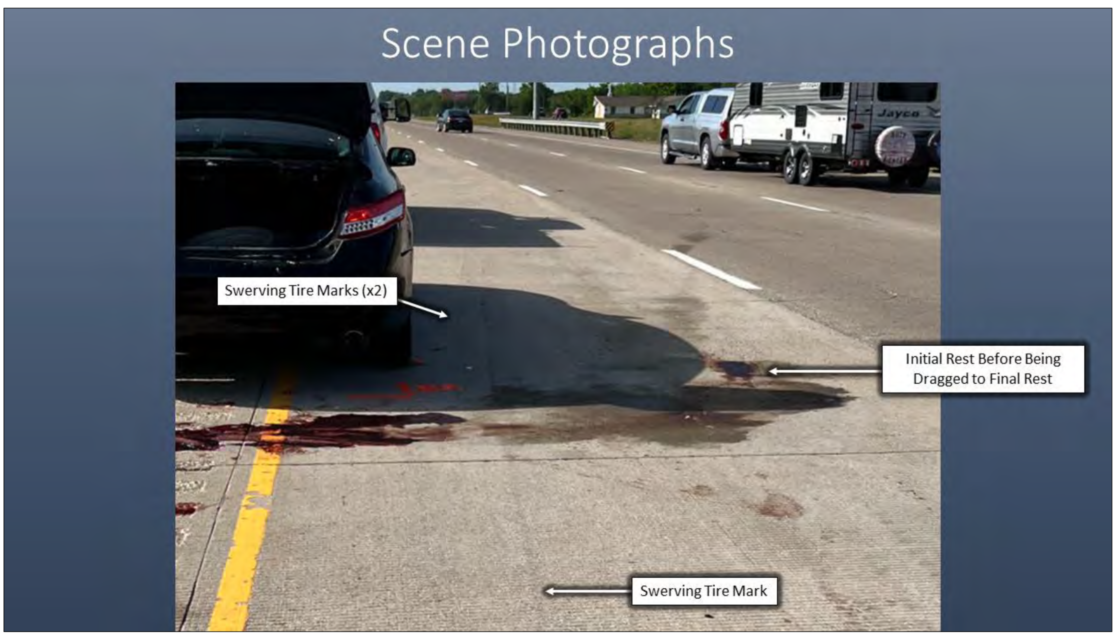

Figure 56: Police photographs.

Figure 57: Police photographs.

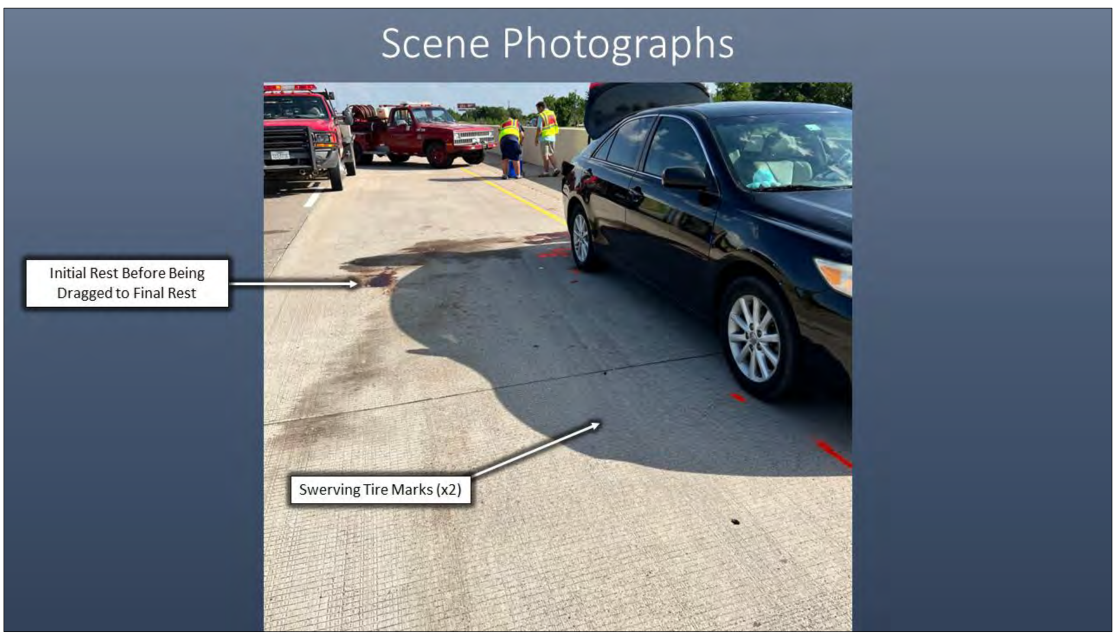

Figure 58: Police photographs.

Figure 59: Police photographs.

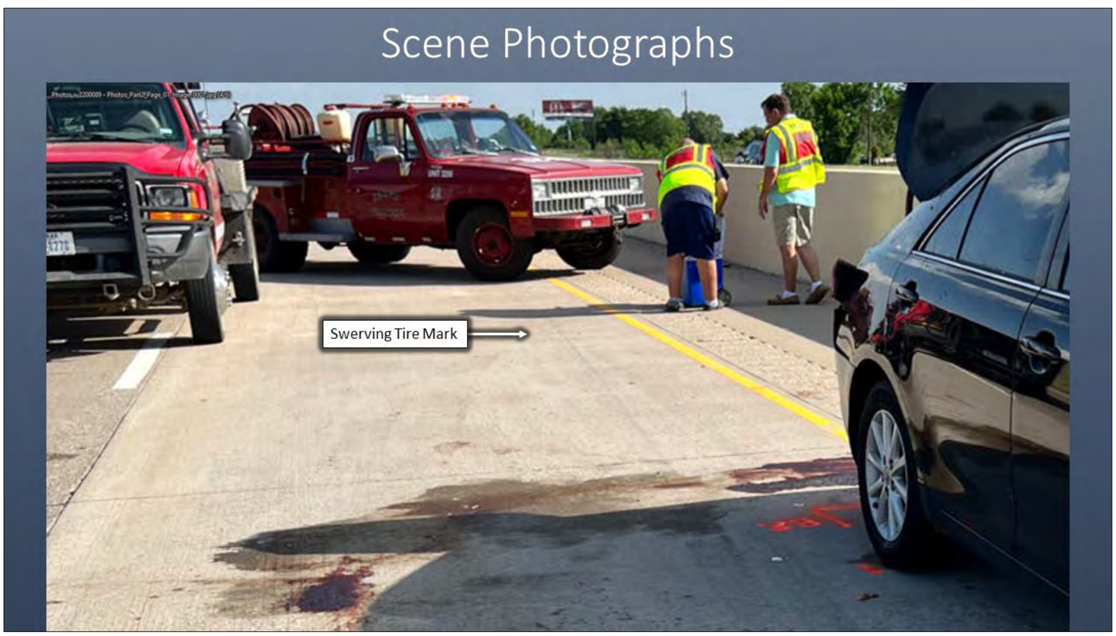

Figure 60: Police photographs.

Figure 61: Police photographs.

Figure 62: Police photographs.

Figure 63: Police photographs – enhanced contrast.

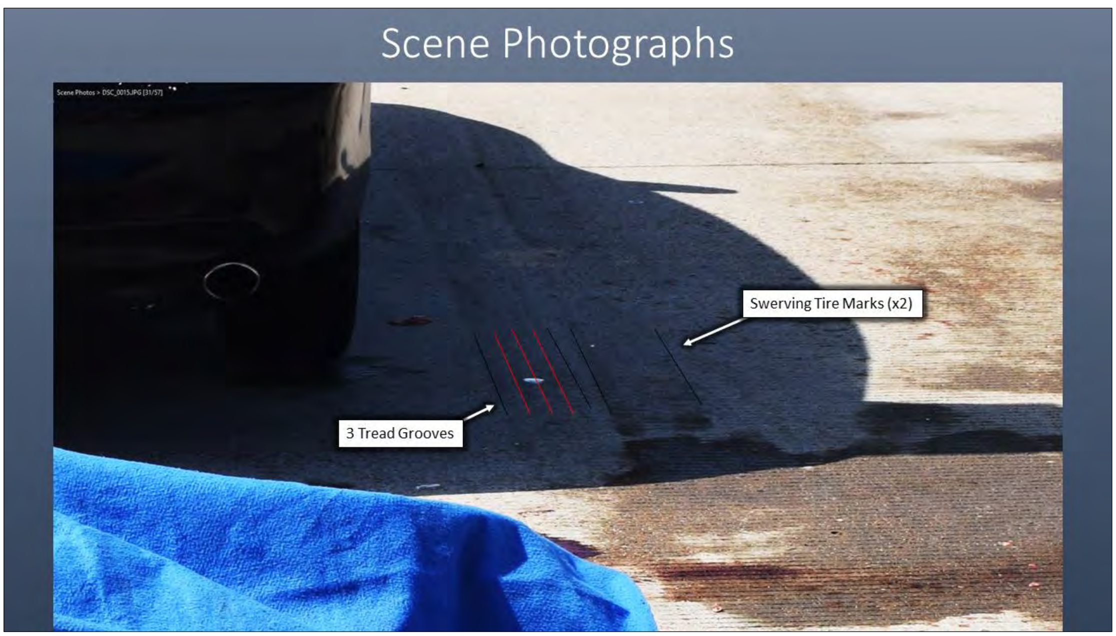

Figure 64: Police photographs.

Figure 65: Ford damage.

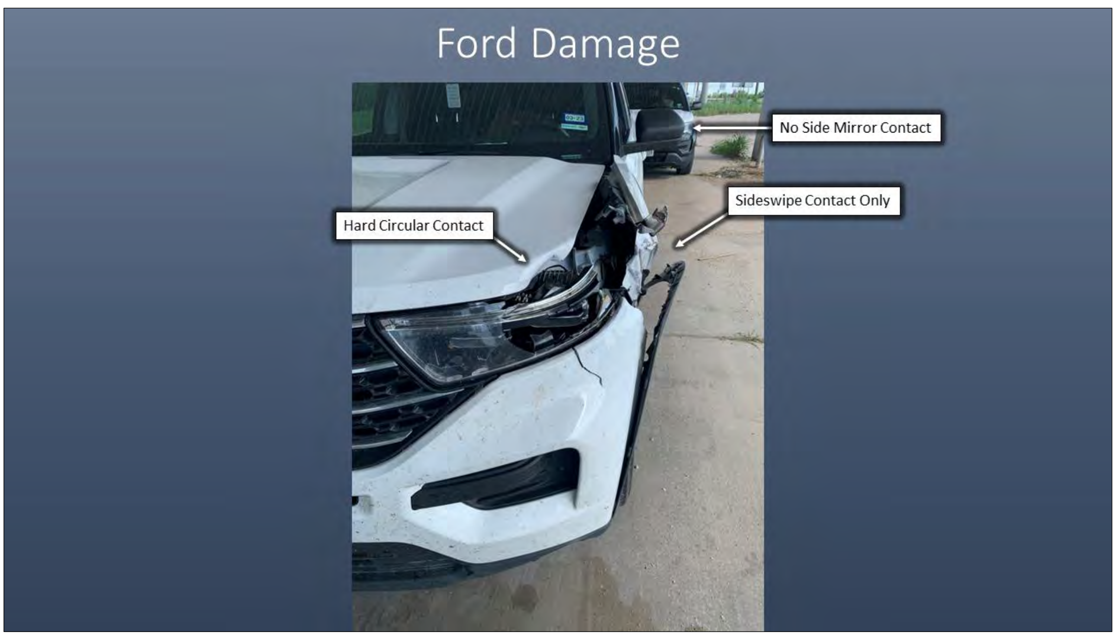

Figure 66: Ford damage.

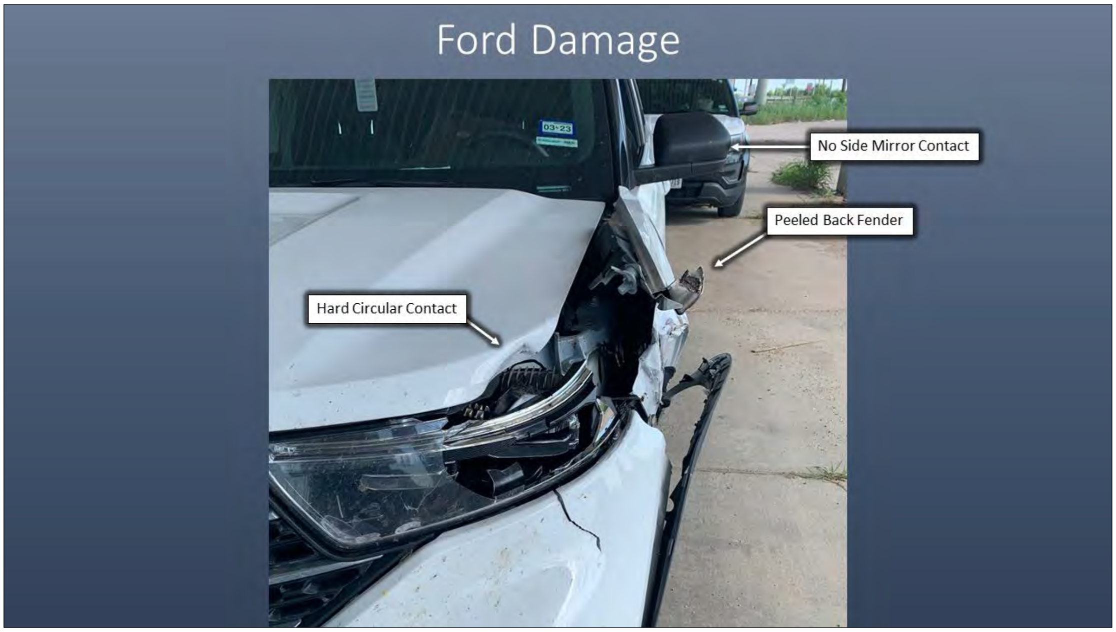

Figure 67: Ford damage.

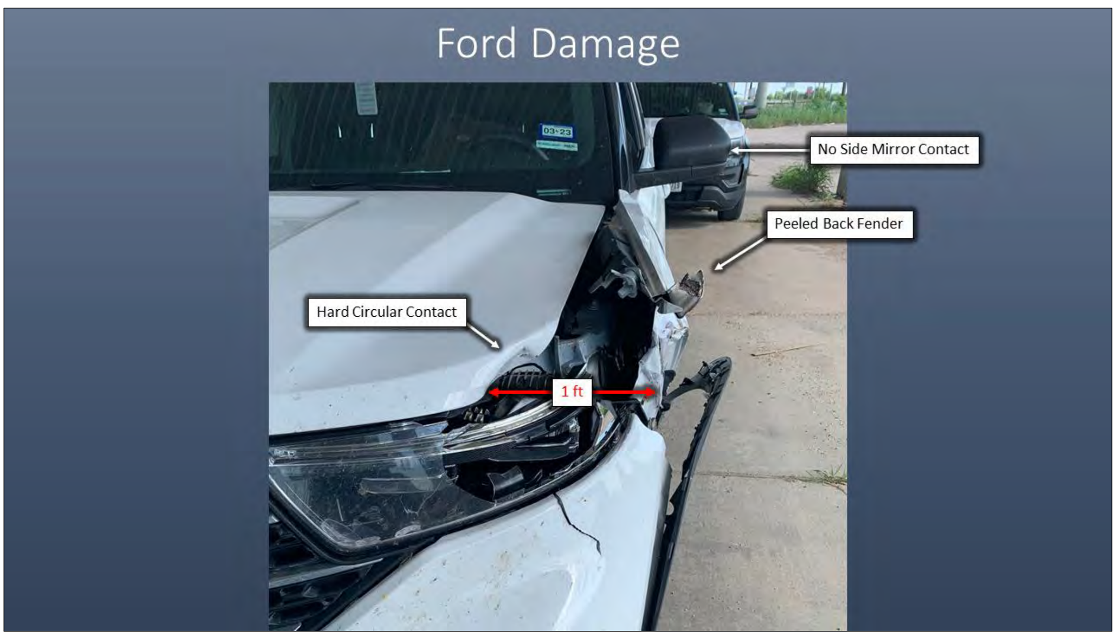

Figure 68: Contact depth = 1 foot from the left side of the Ford.

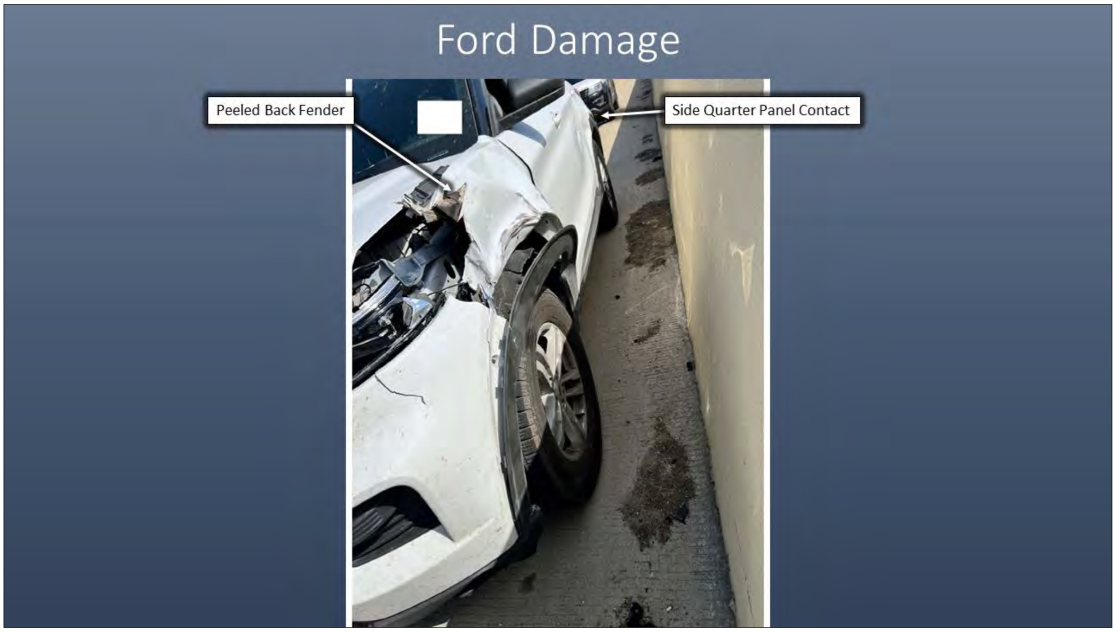

Figure 69: Ford damage.

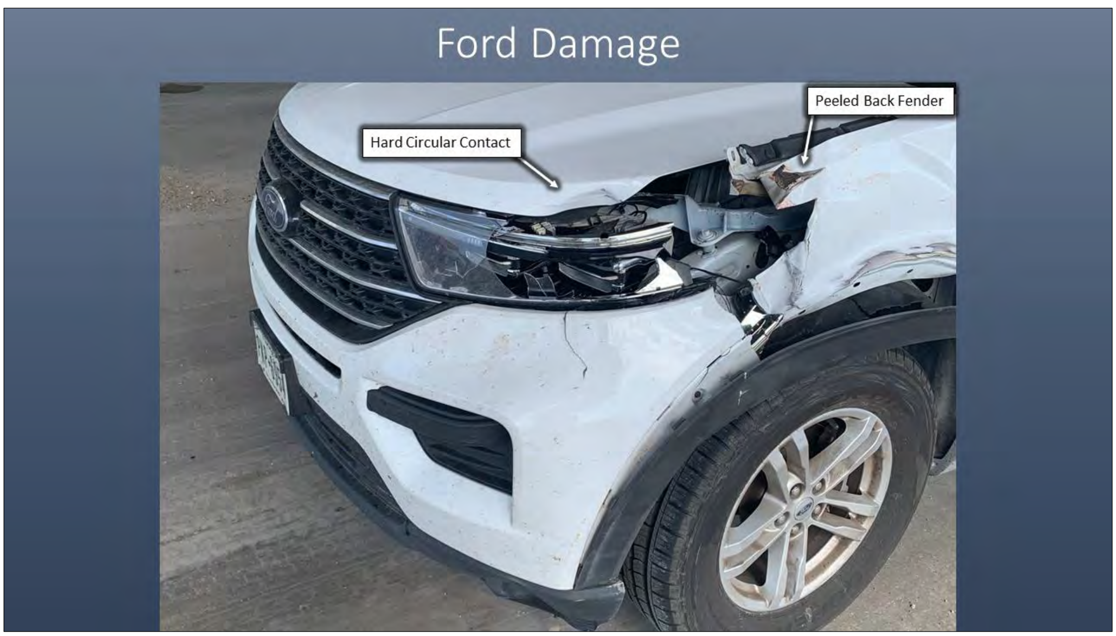

Figure 70: Ford damage.

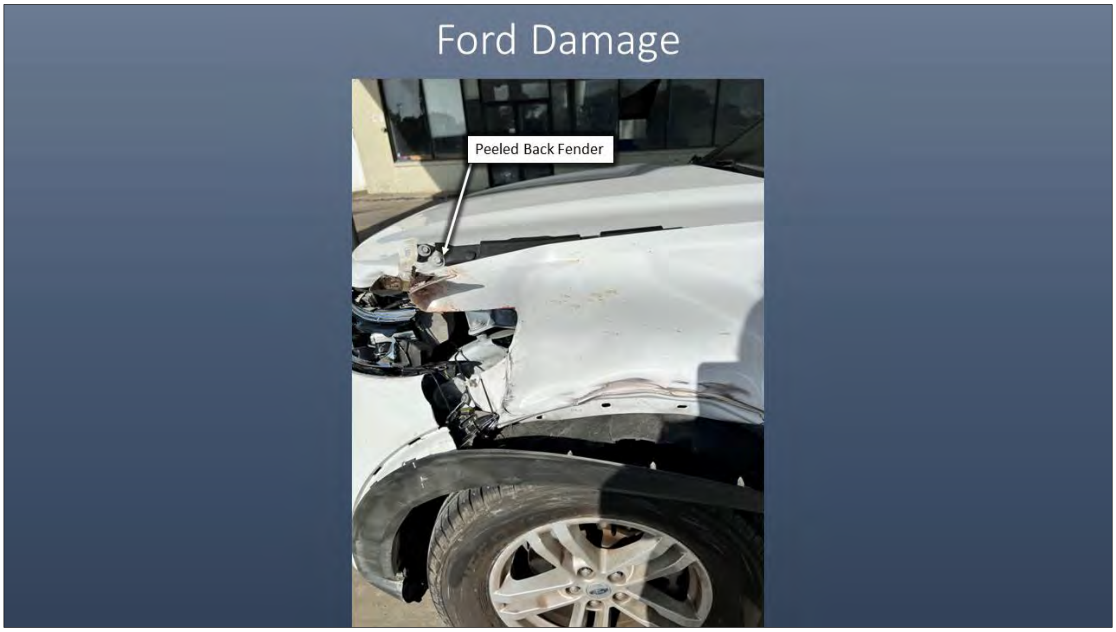

Figure 71: Ford damage.

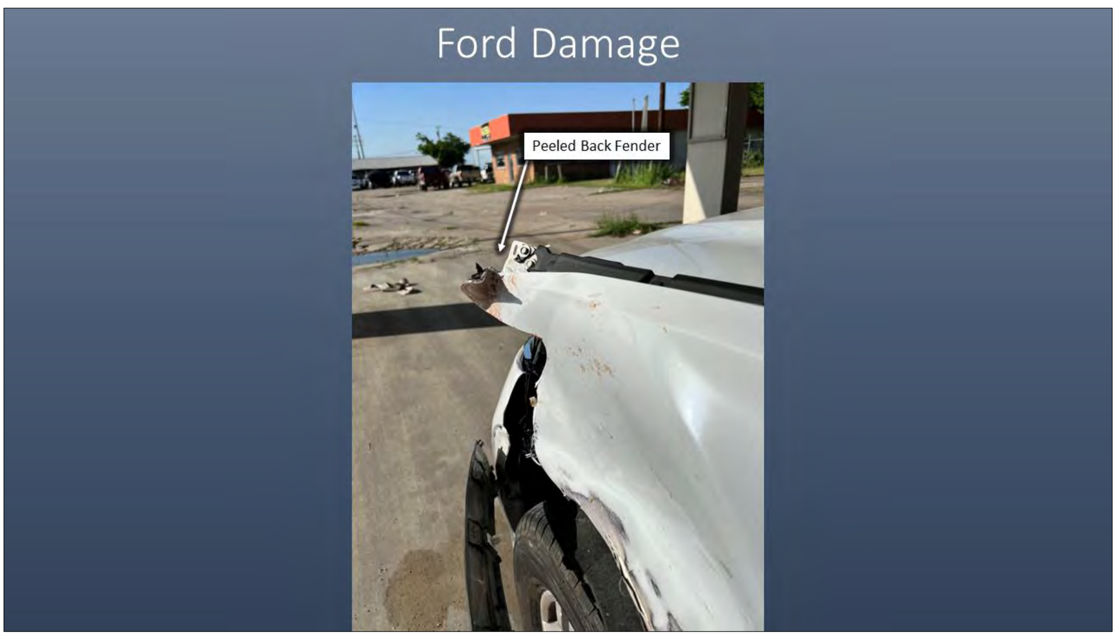

Figure 72: Ford damage.

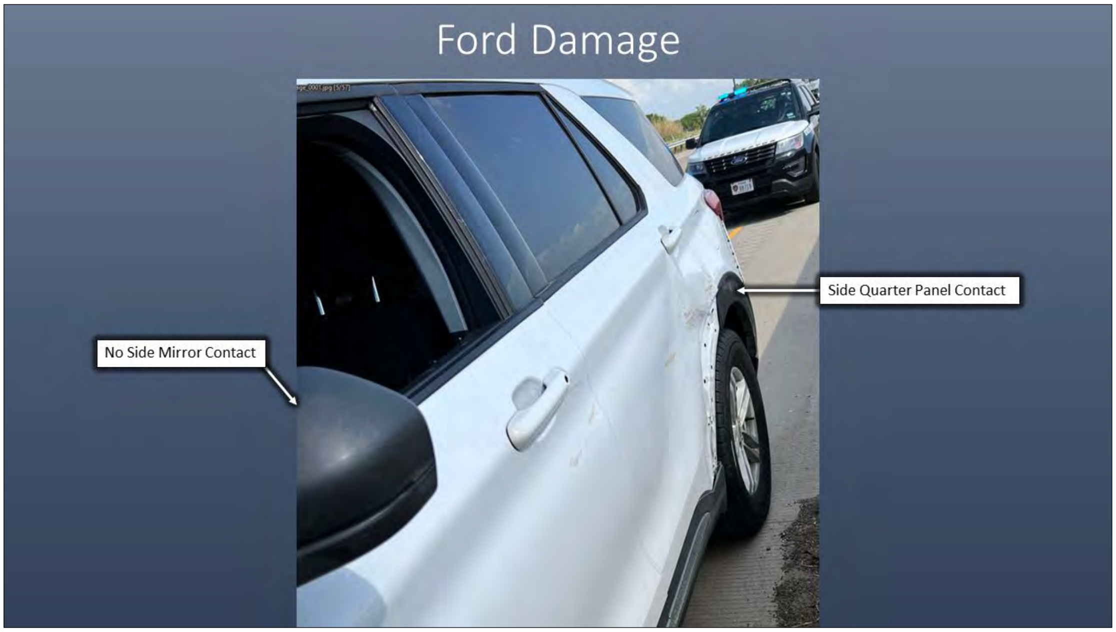

Figure 73: Ford damage.

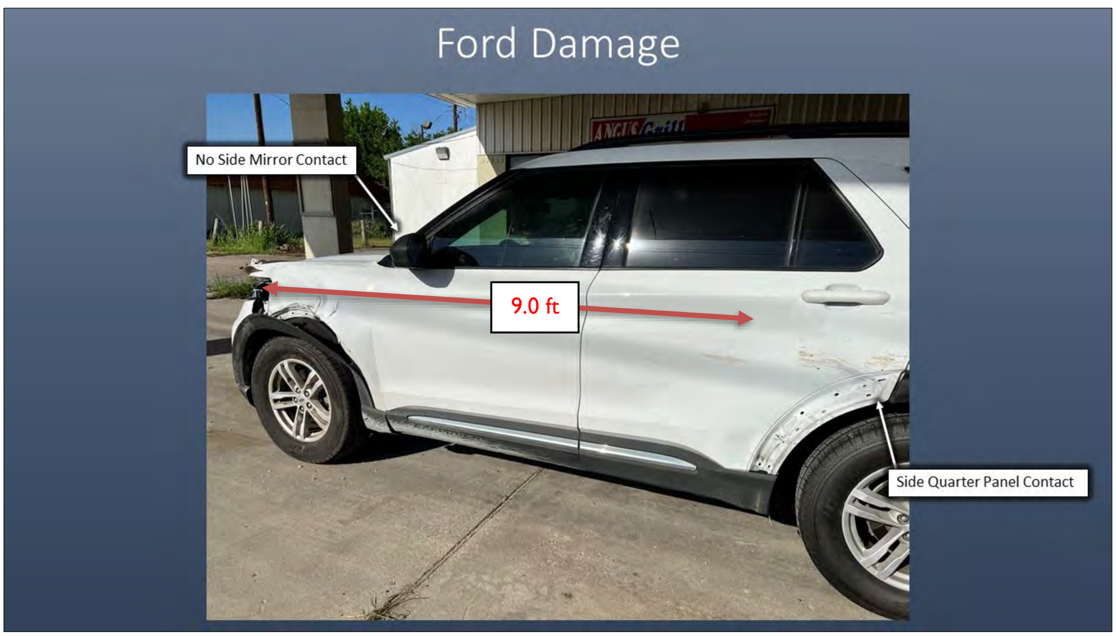

Figure 74: Ford damage – Gap in damage of approximately 9.0 feet.

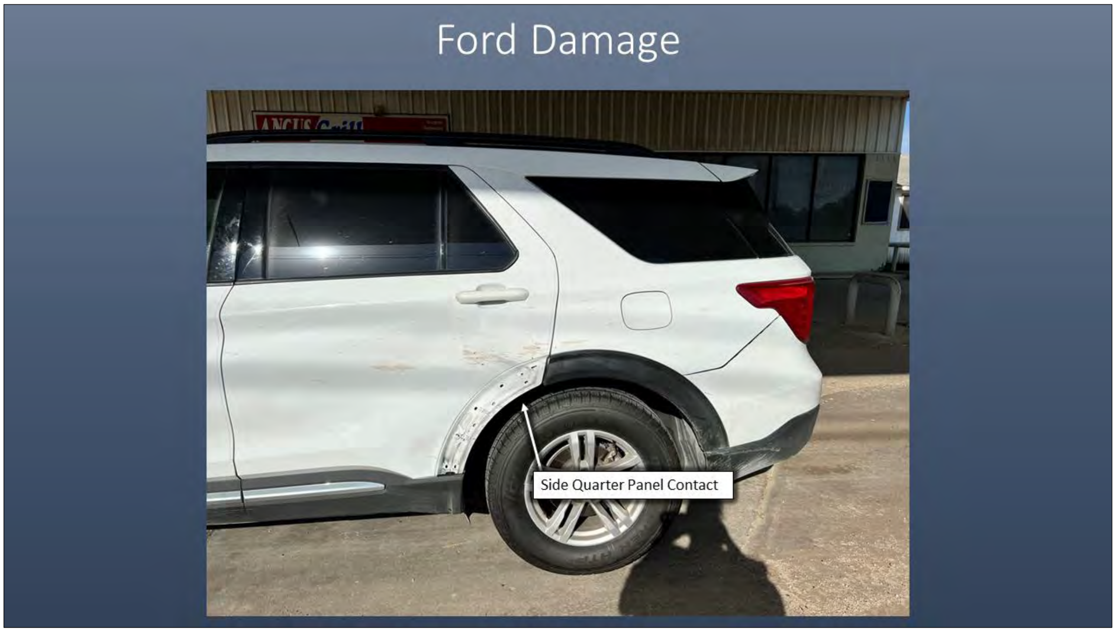

Figure 75: Ford damage.

Figure 76: Ford damage.

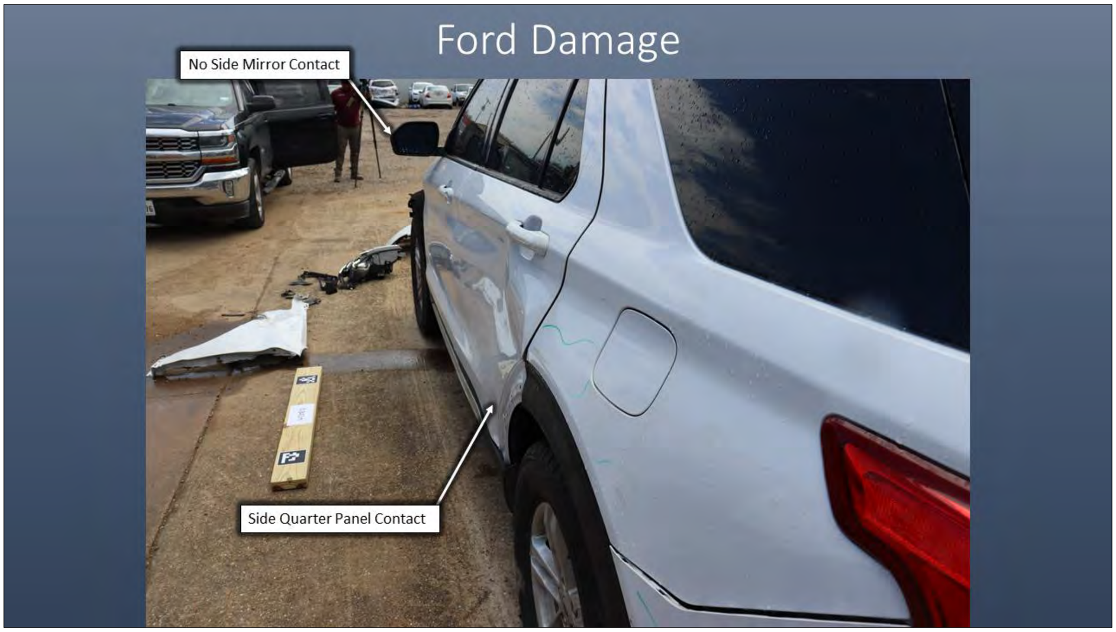

Figure 77: Ford damage.

Figure 78: Ford damage.

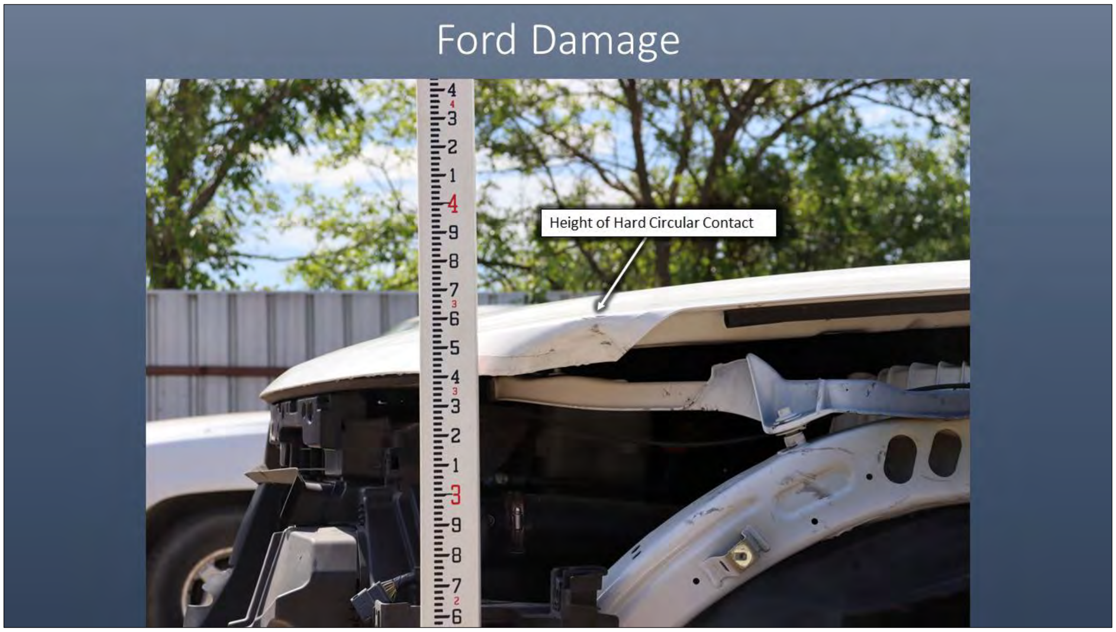

Figure 79: Ford damage.

Figure 80: Ford damage.

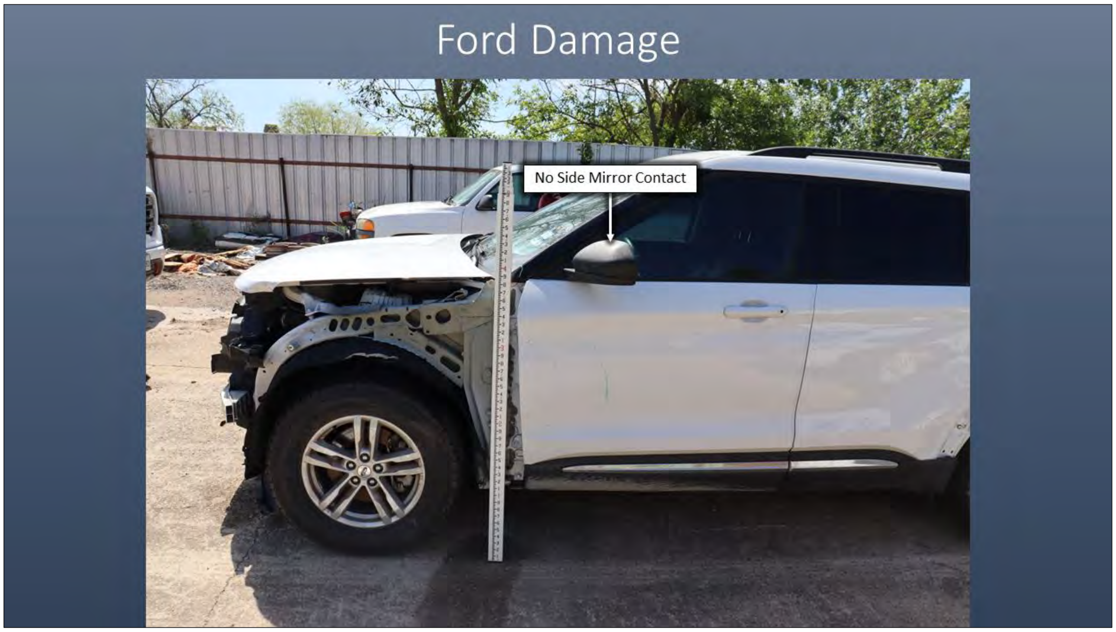

Figure 81: Ford damage.

Figure 82: Ford tread pattern.

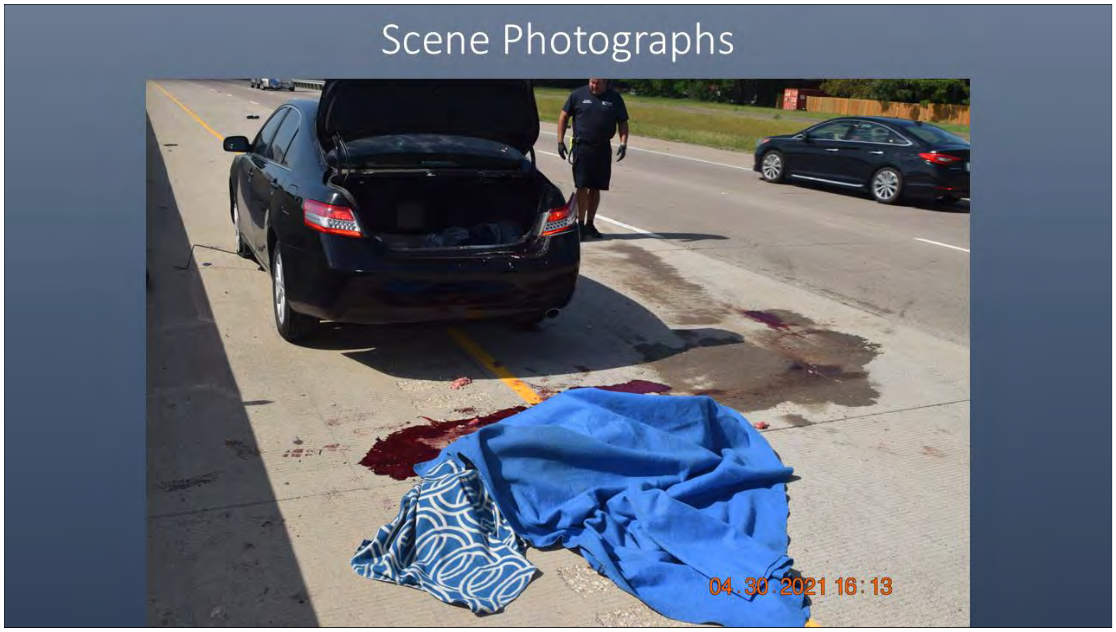

Figure 83: Body material onto Toyota.

Figure 84: Body material onto Toyota.

Figure 85: Body material onto Toyota.

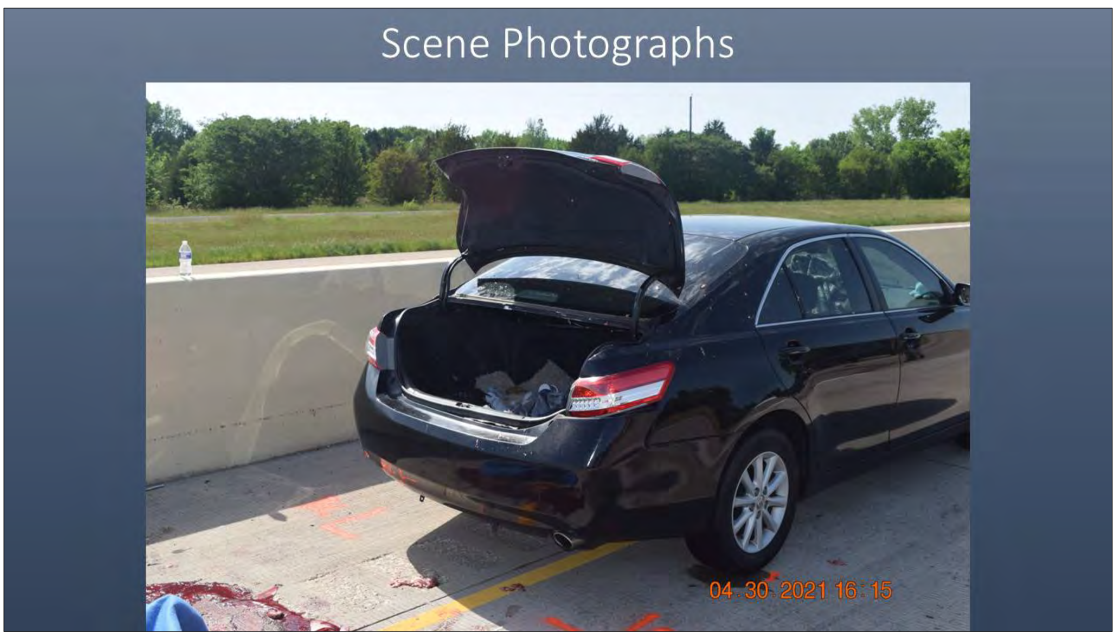

Figure 86: Body material onto Toyota.

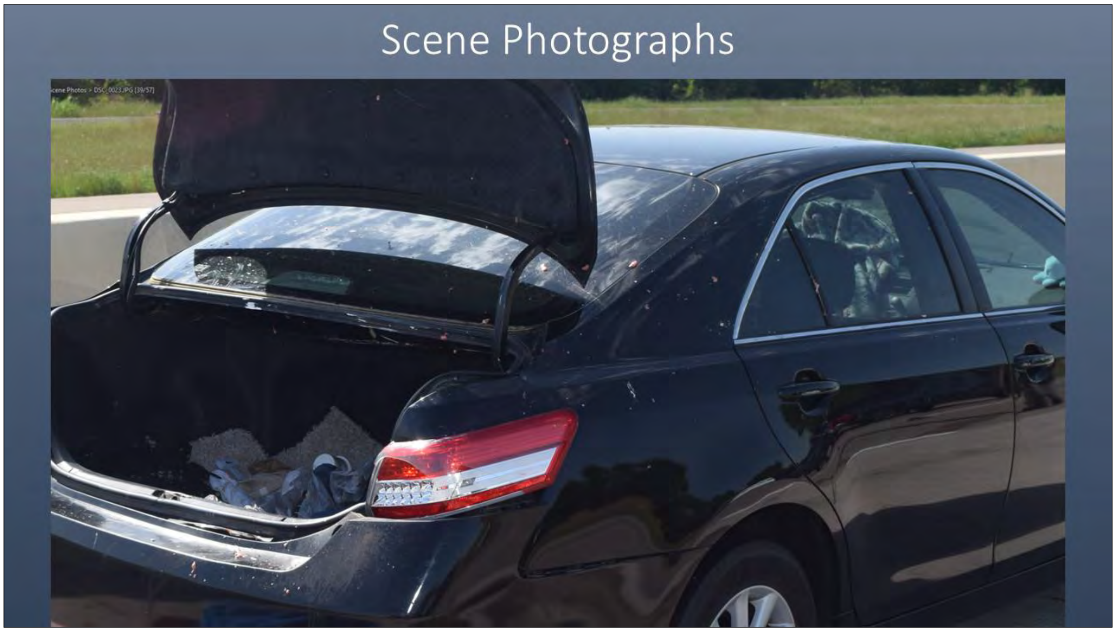

Figure 87: Body material onto Toyota.

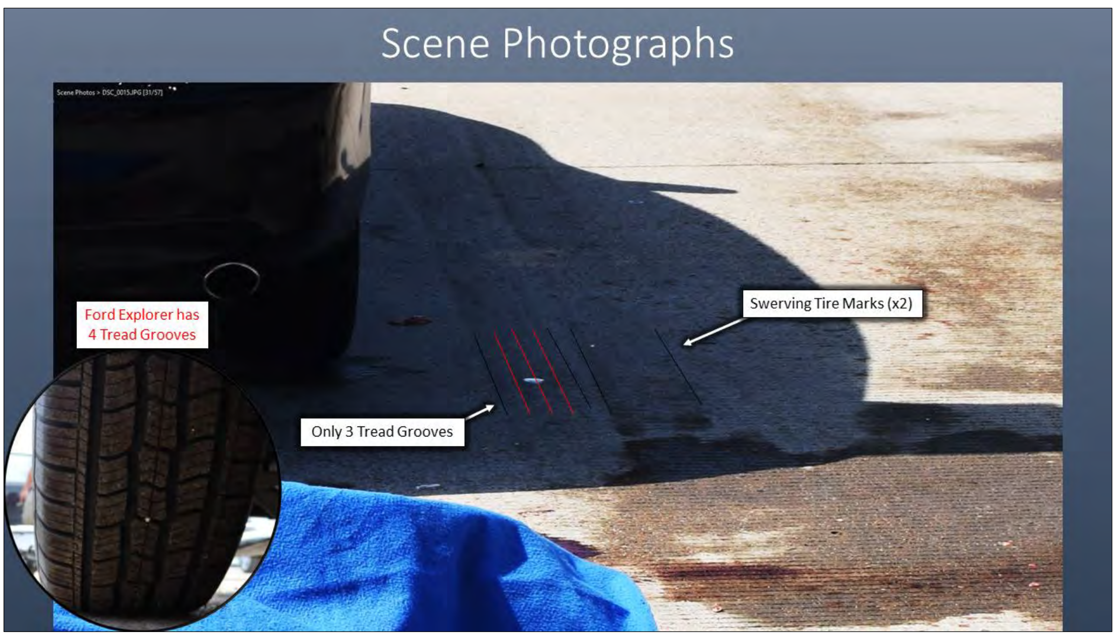

Figure 88: Police photographs comparing tread pattern.

Figure 89: Graphical Photogrammetry.

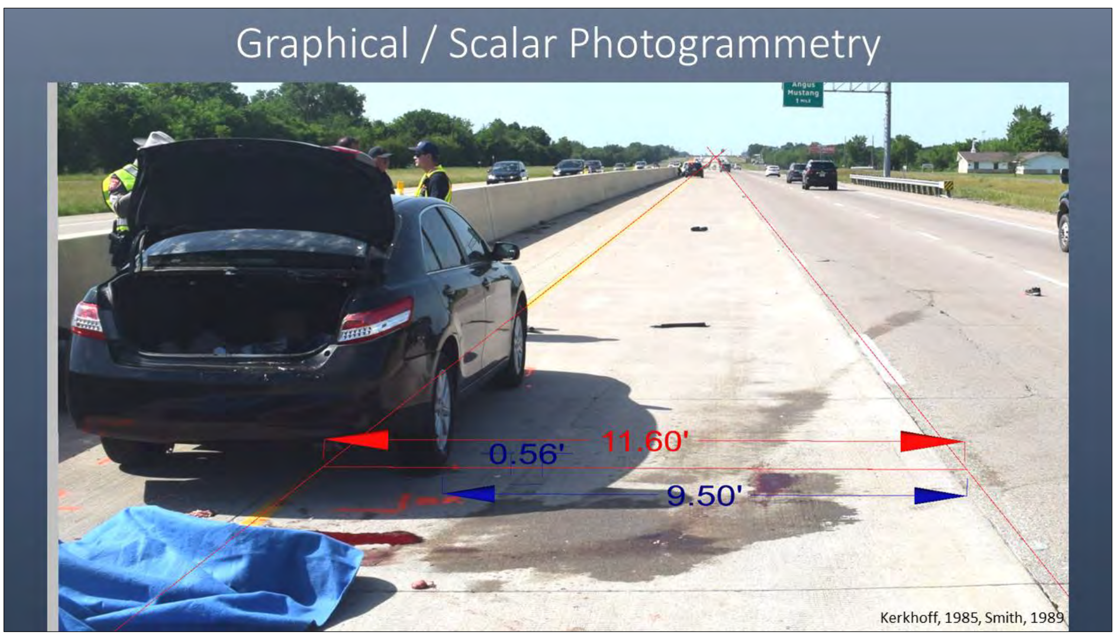

Figure 90: Scalar Photogrammetry.

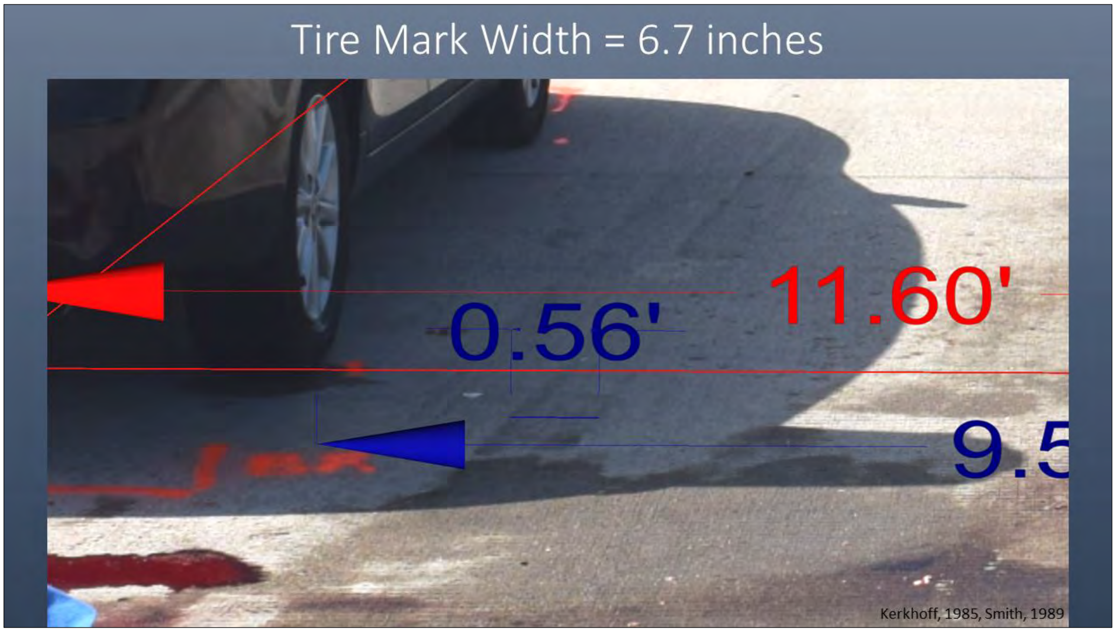

Figure 91: Tire mark width with scalar photogrammetry.

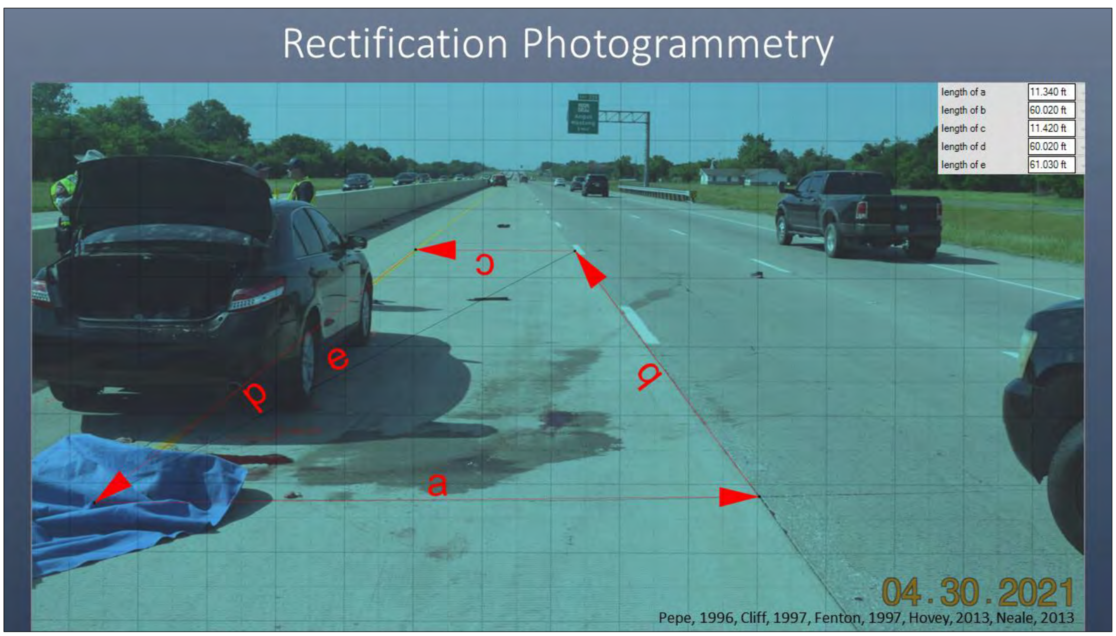

Figure 92: Rectification Photogrammetry.

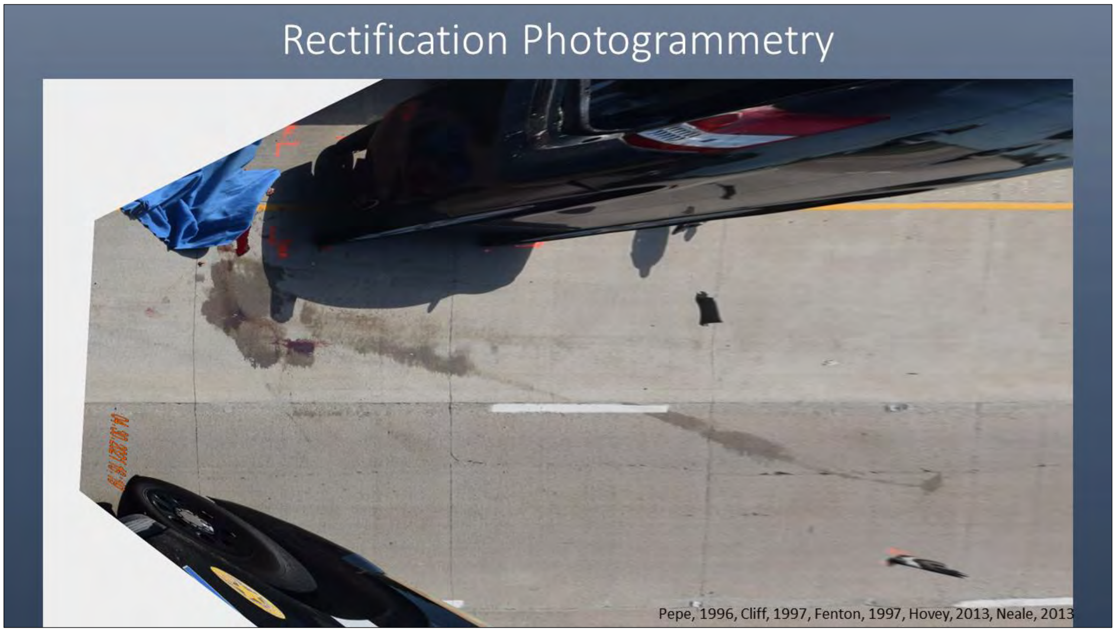

Figure 93: Rectification Photogrammetry.

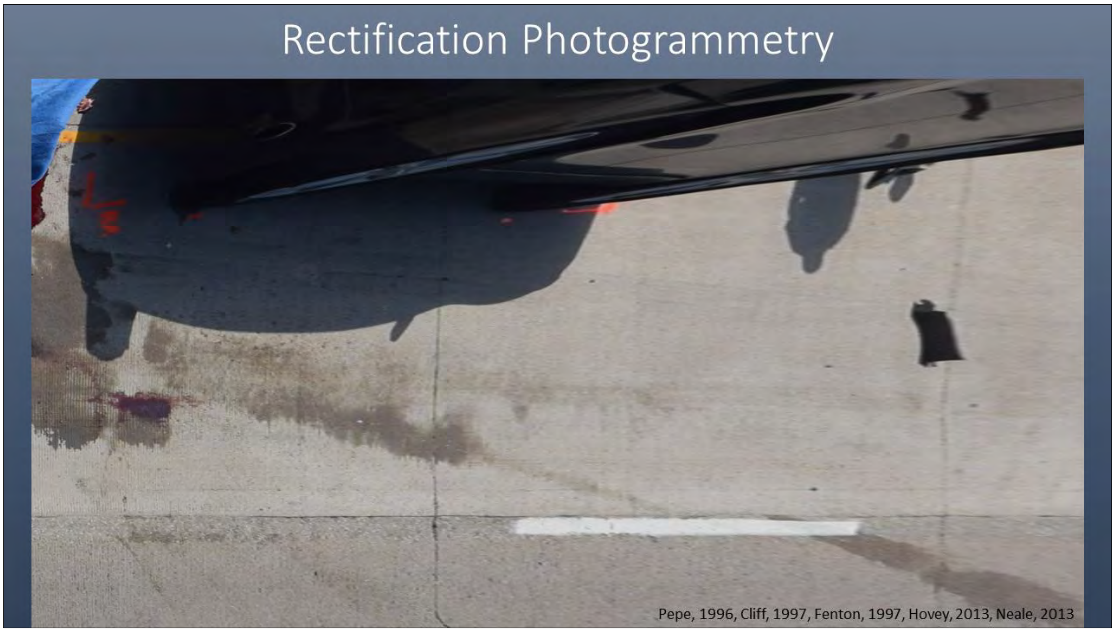

Figure 94: Rectification Photogrammetry.

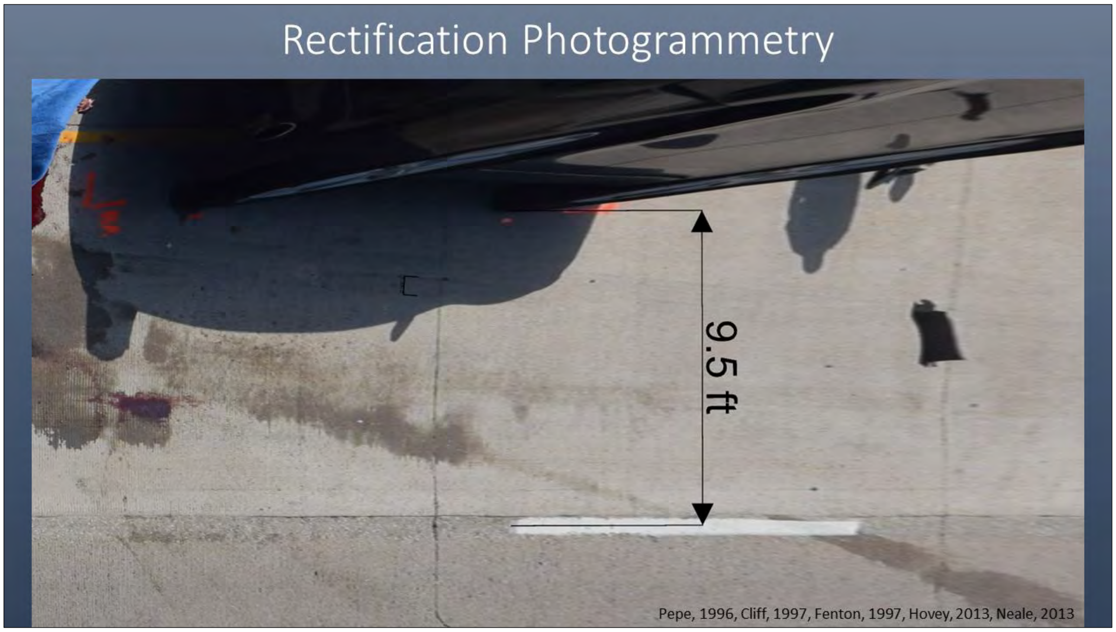

Figure 95: Rectification Photogrammetry.

Figure 96: Tire mark width with rectification photogrammetry.

Figure 97: Tire mark width with rectification photogrammetry.

Figure 98: Traditional Photogrammetry.

Figure 99: Traditional Photogrammetry.

Figure 100: Traditional Photogrammetry.

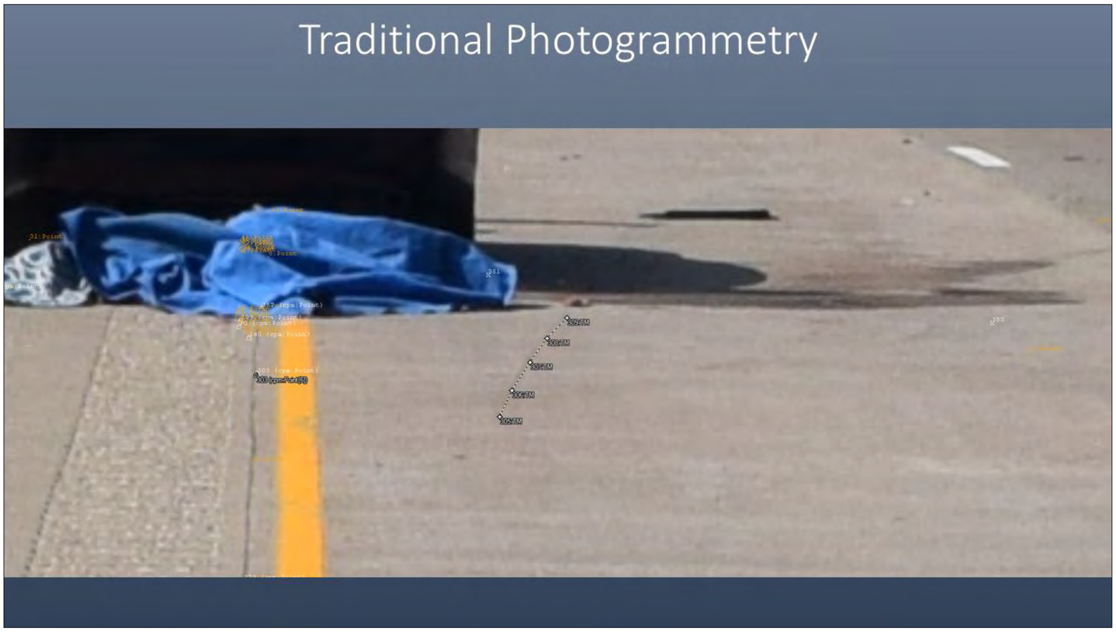

Figure 101: Traditional Photogrammetry.

Figure 102: Traditional Photogrammetry.

Figure 103: Traditional Photogrammetry.

Figure 104: Traditional Photogrammetry.

Figure 105: Traditional Photogrammetry.

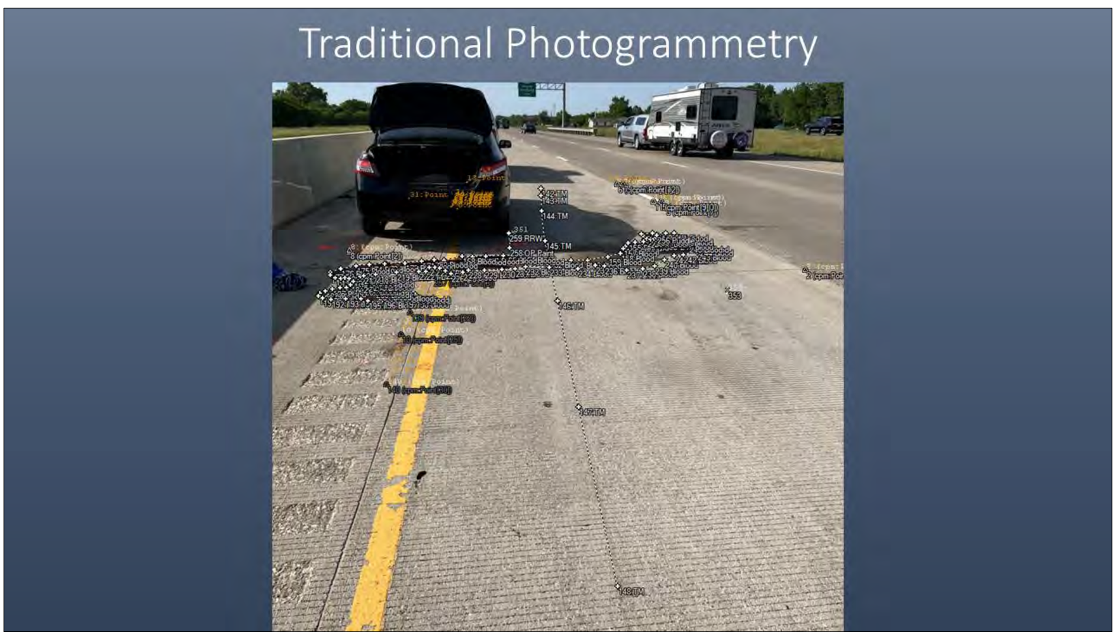

Figure 106: Traditional Photogrammetry.

Figure 107: Traditional Photogrammetry.

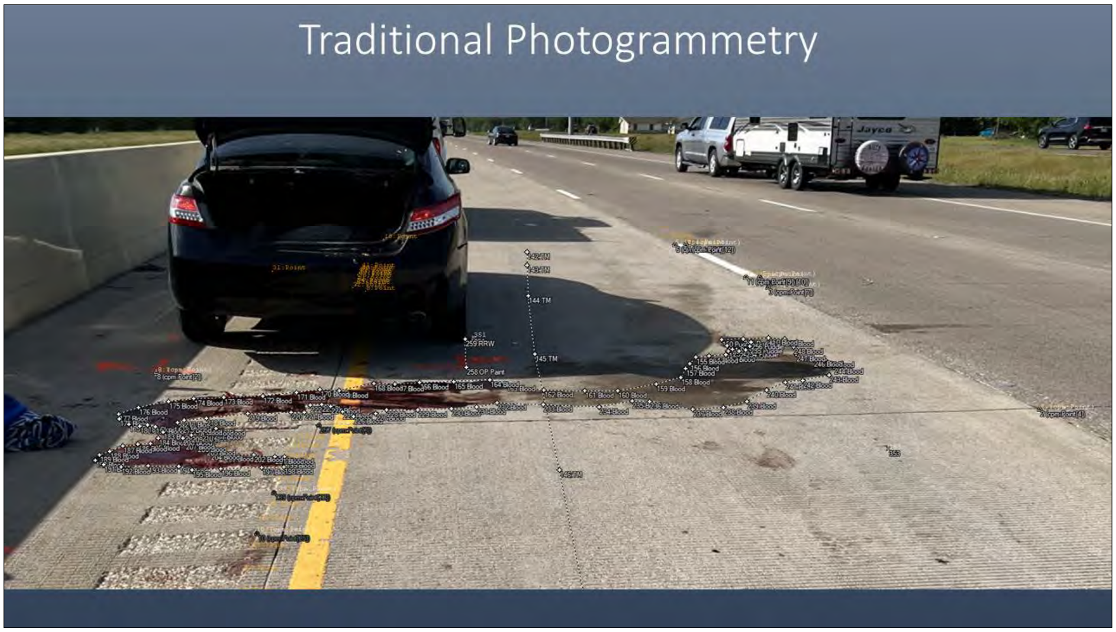

Figure 108: Traditional Photogrammetry.

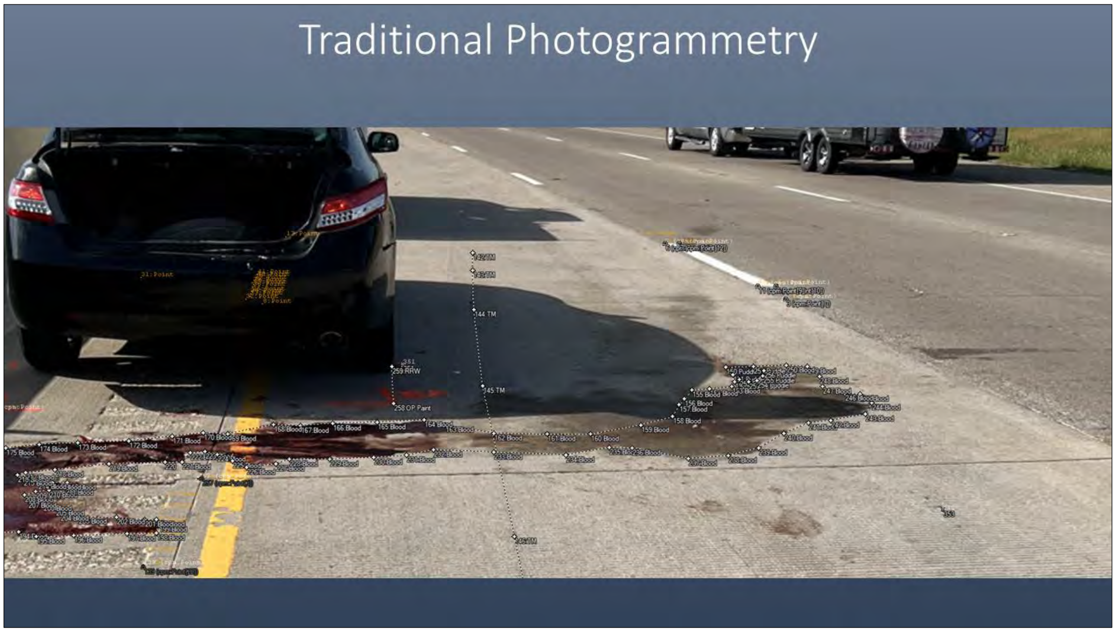

Figure 109: Traditional Photogrammetry.

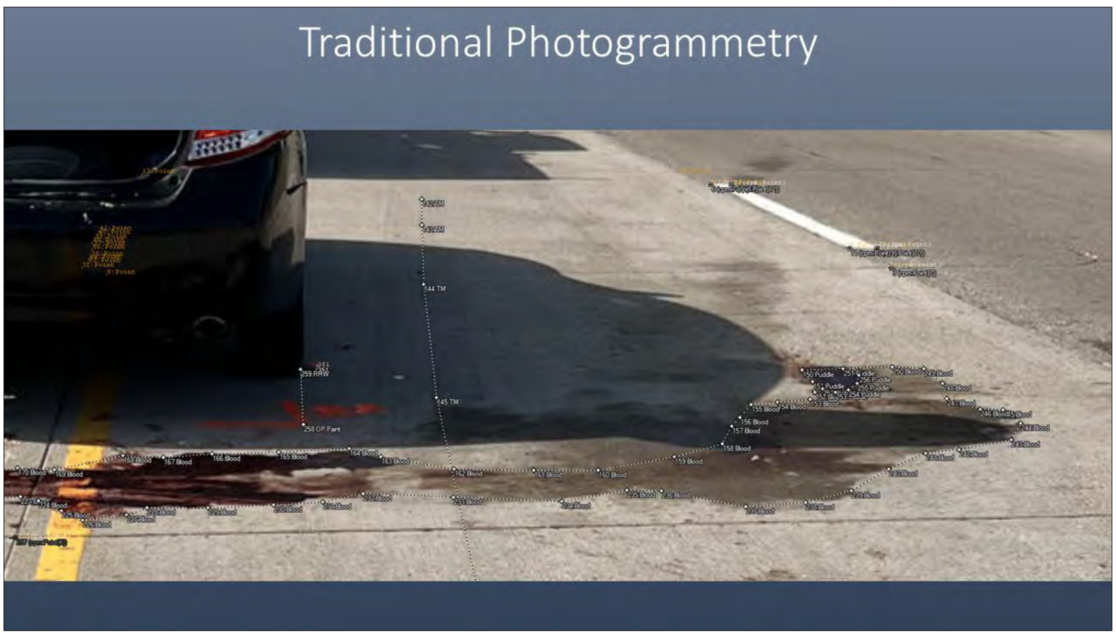

Figure 110: Traditional Photogrammetry.

Figure 111: Tire mark width with traditional photogrammetry.

Figure 112: Tire mark width with traditional photogrammetry.

Figure 113: Tire mark width with traditional photogrammetry.

Figure 114: 3D scan of Ford and tread width.

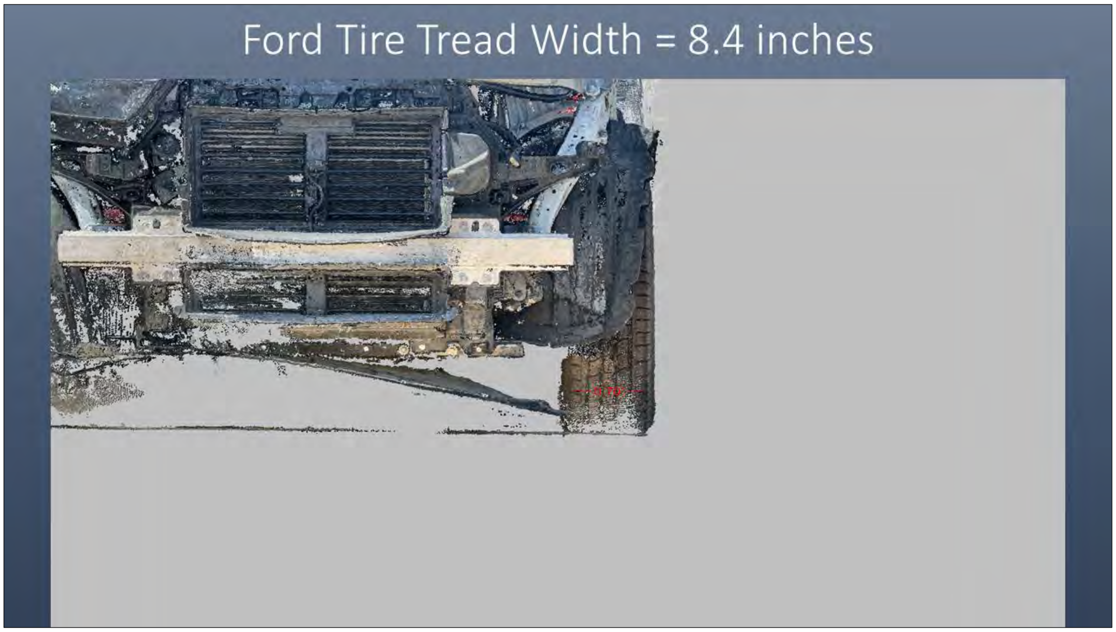

Figure 115: 3D scan of Ford and tread width.

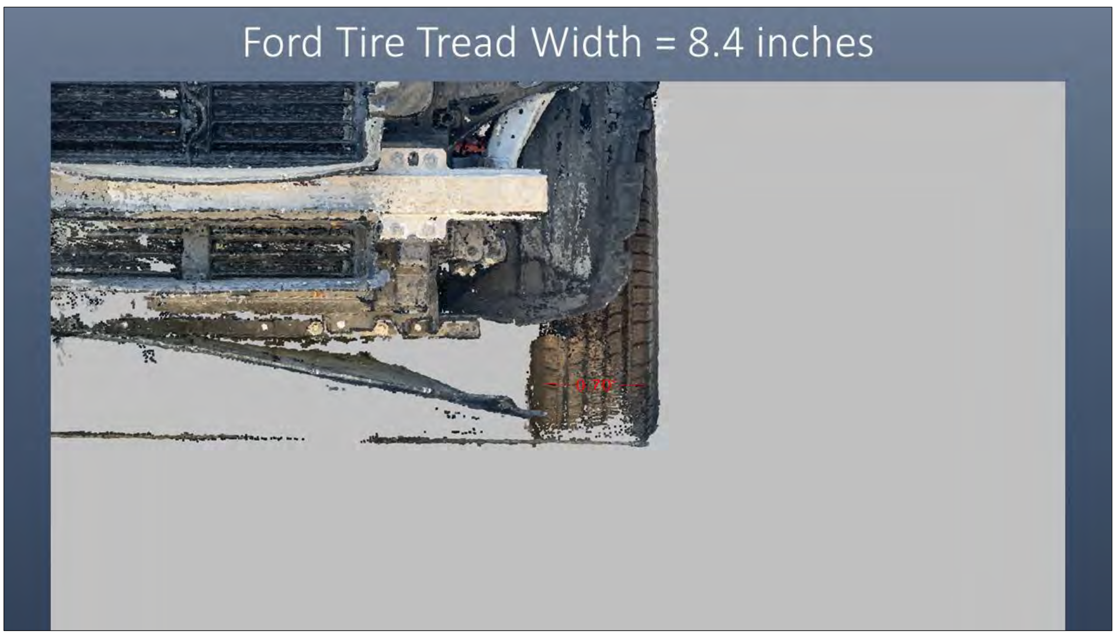

Figure 116: 3D scan of Ford and tread width.

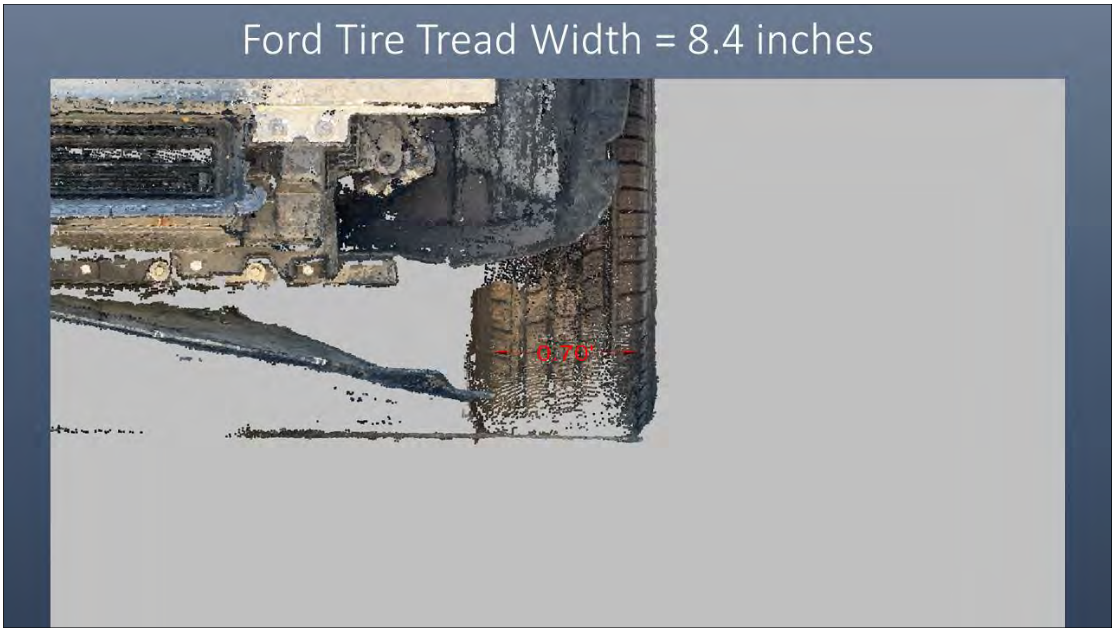

Figure 117: 3D scan of Ford and tread width.

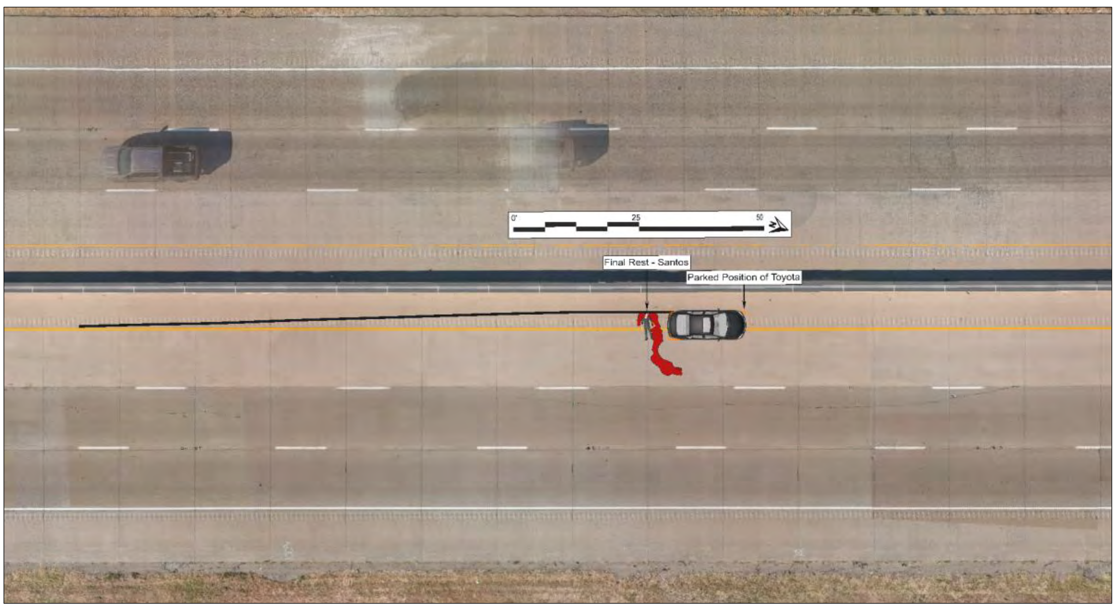

Figure 118: Scene evidence diagram.

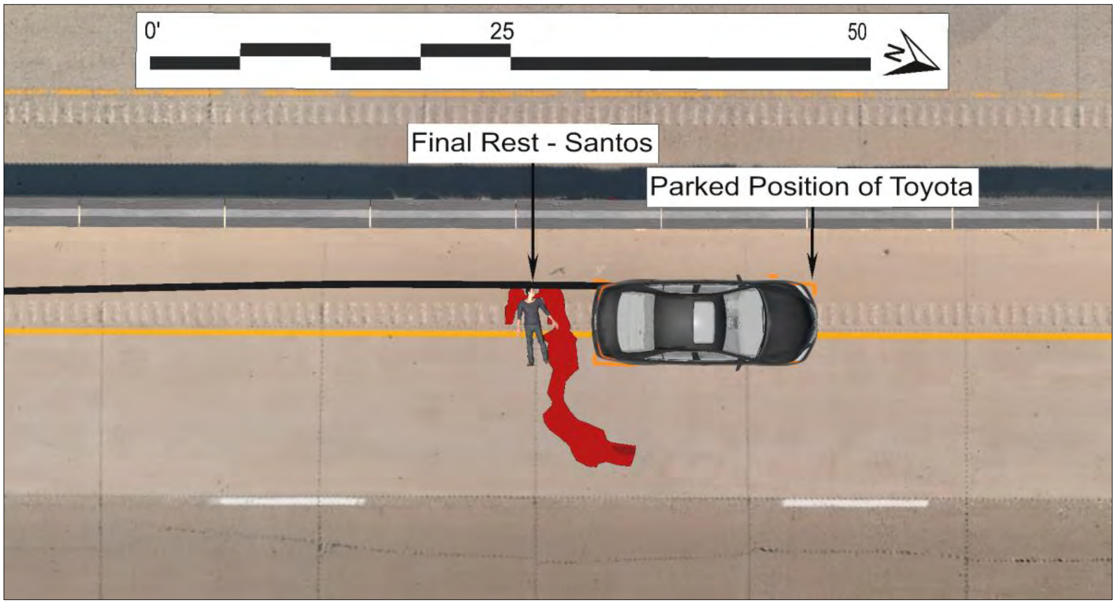

Figure 119: Scene evidence diagram.

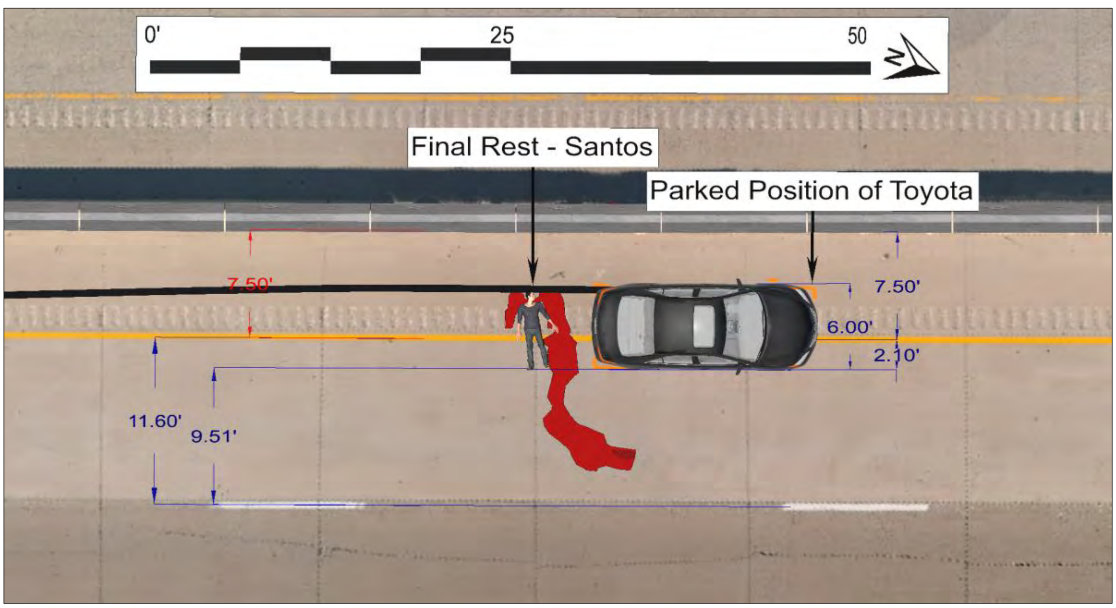

Figure 120: Scene evidence diagram measurements.

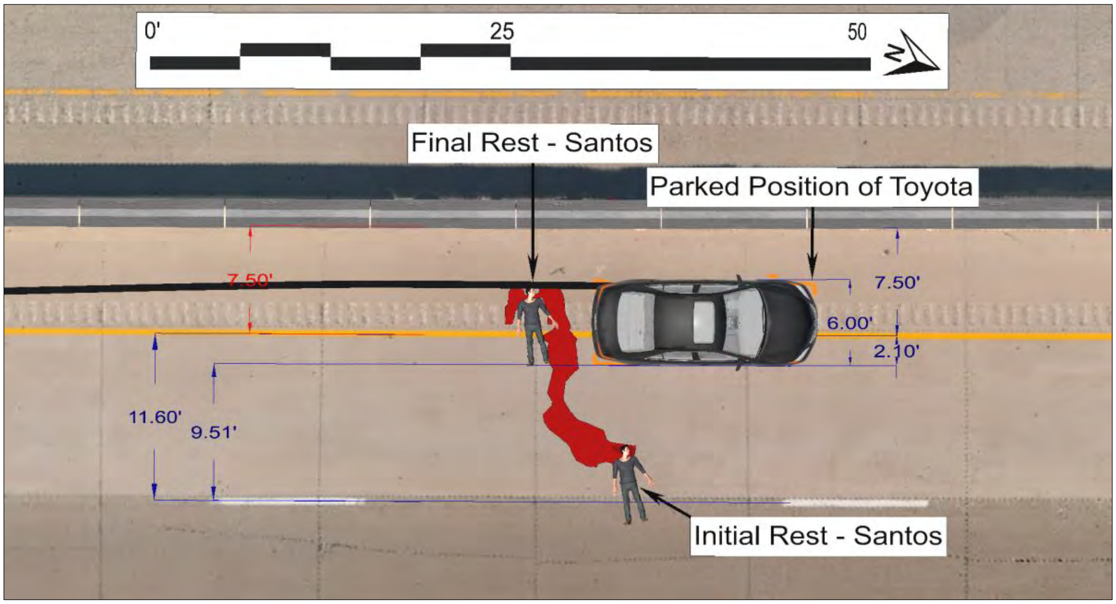

Figure 121: Approximate initial rest of Mr. Santos.

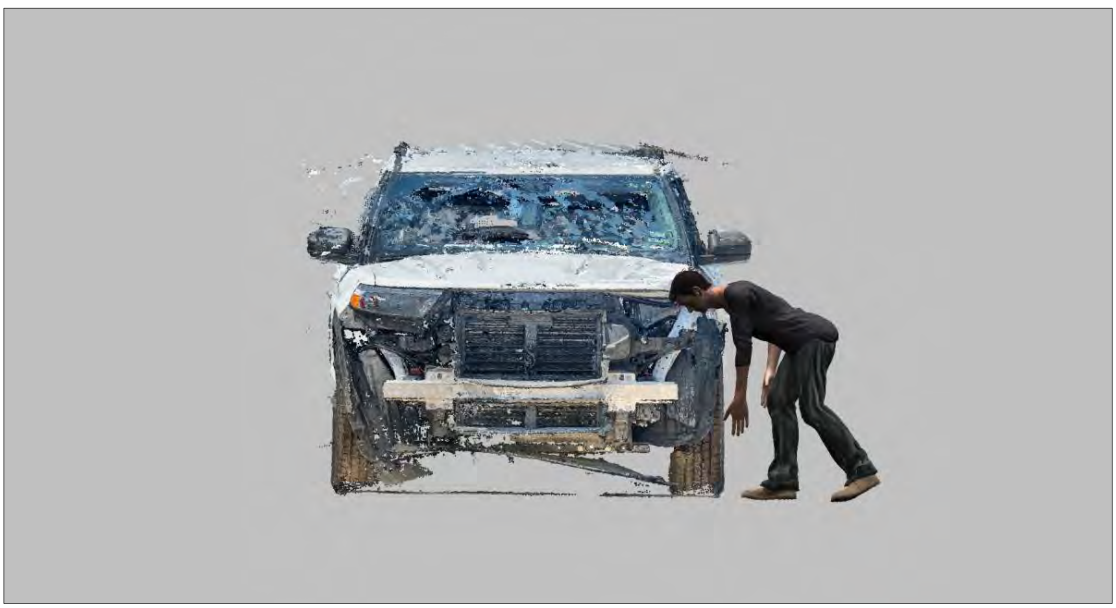

Figure 122: Impact model match.

Figure 123: Impact model match.

Figure 124: Impact model match.

Figure 125: Impact model match.

Figure 126: Impact model match.

Figure 127: Impact model match.

Figure 128: Impact model match.

Figure 129: Impact model match.

Figure 130: Impact model match.

Figure 131: Impact model match.

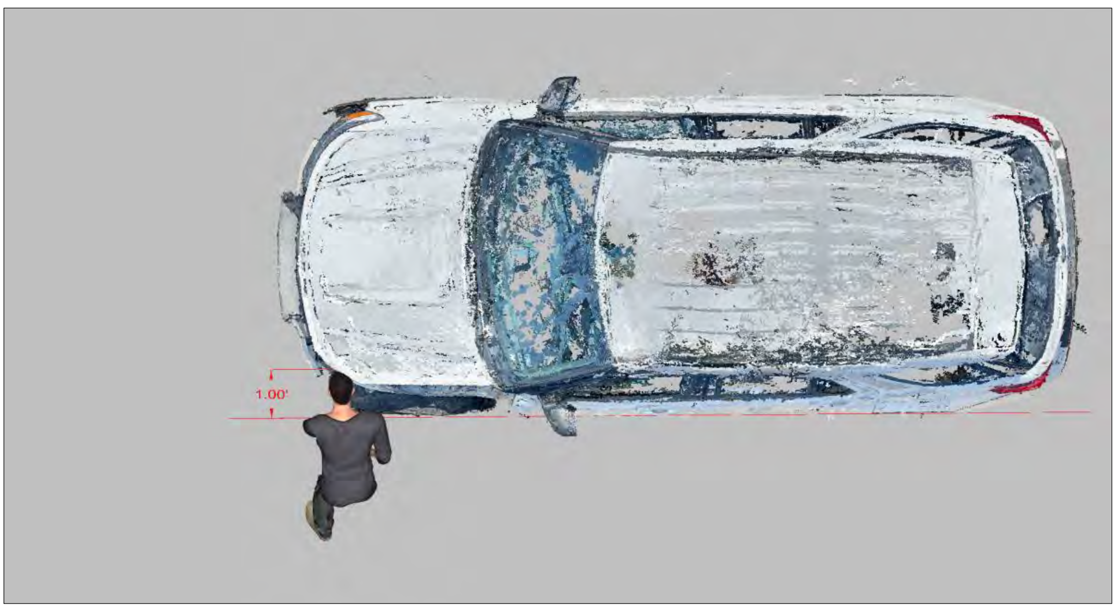

Figure 132: Impact model match.

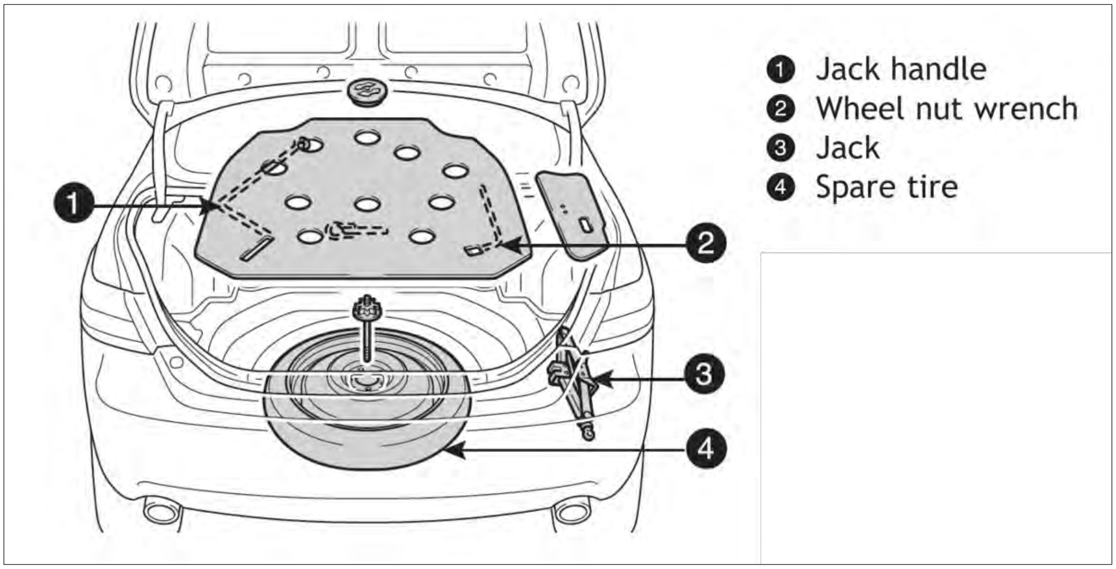

Figure 133: Toyota owner's manual instructions on replacing spare tire.

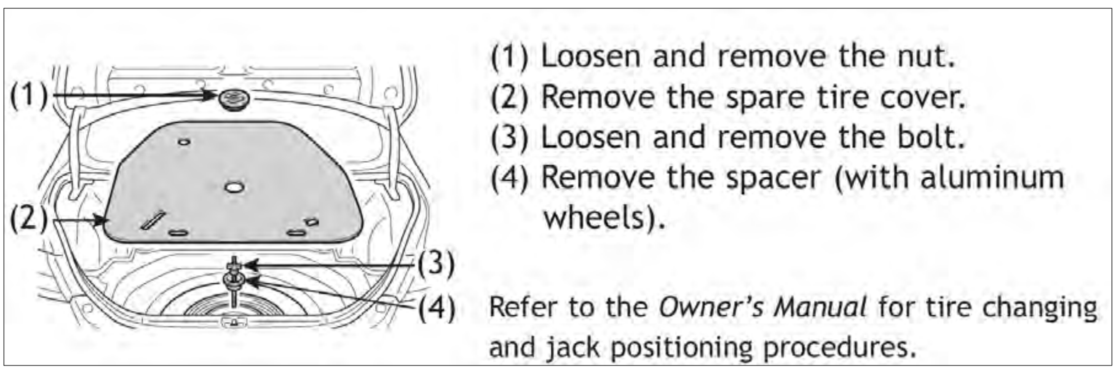

Figure 134: Toyota owner's manual instructions on replacing spare tire.

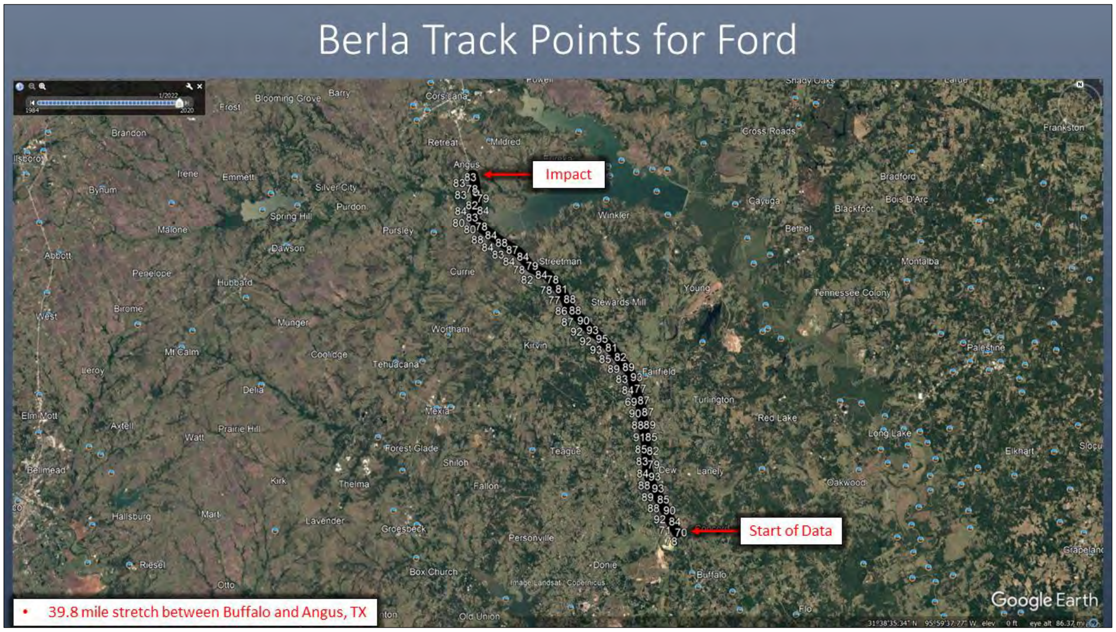

Figure 135: Berla track point data.

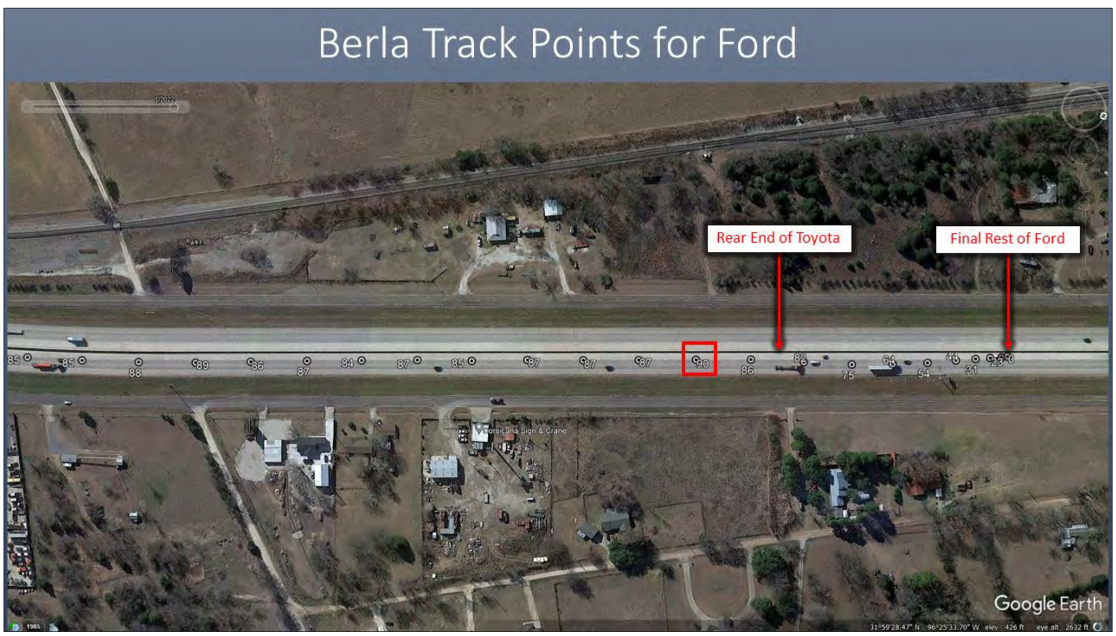

Figure 136: Berla track point data.

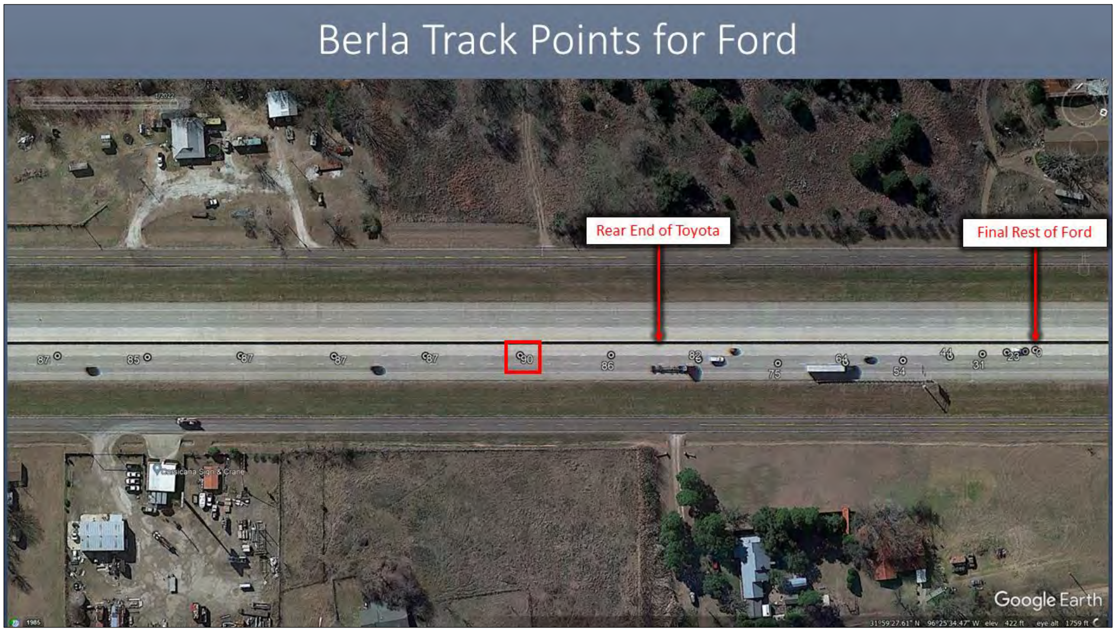

Figure 137: Berla track point data.

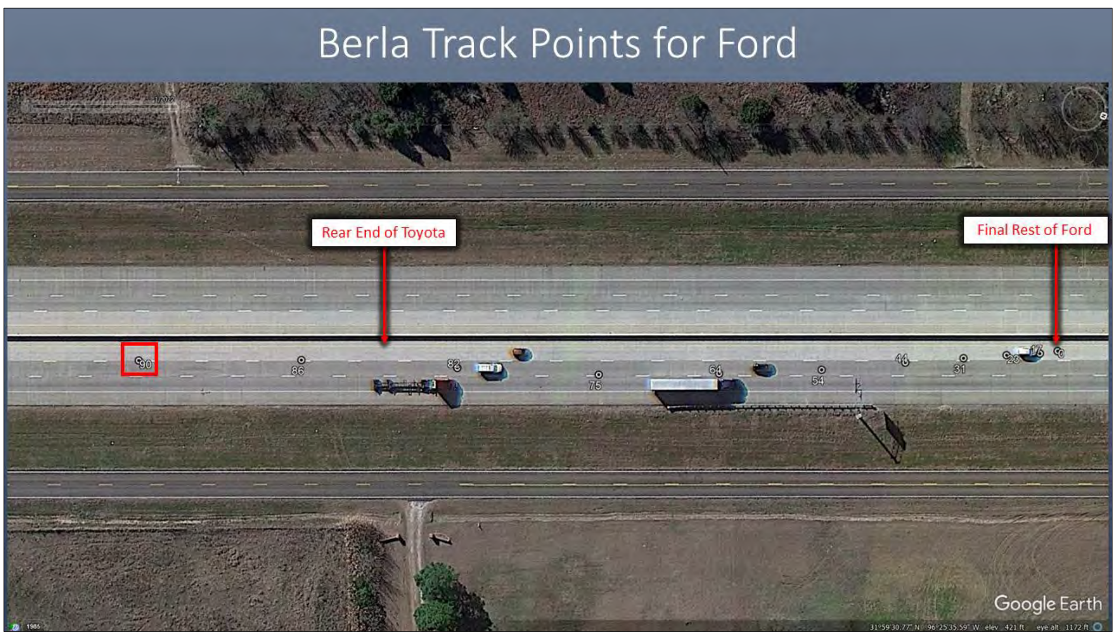

Figure 138: Berla track point data.

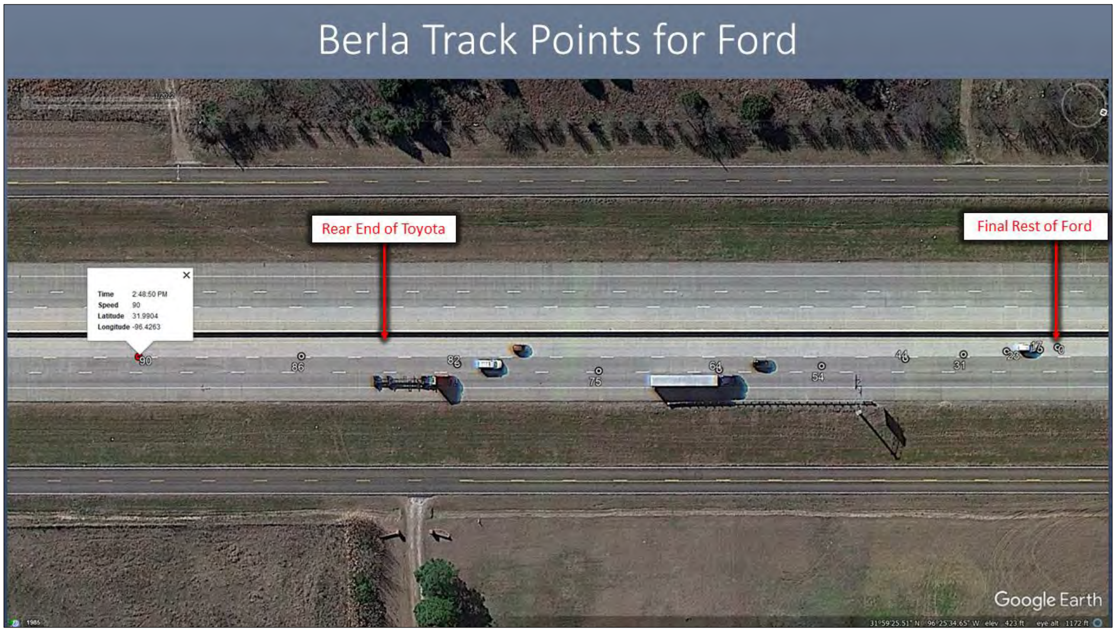

Figure 139: Berla track point data.

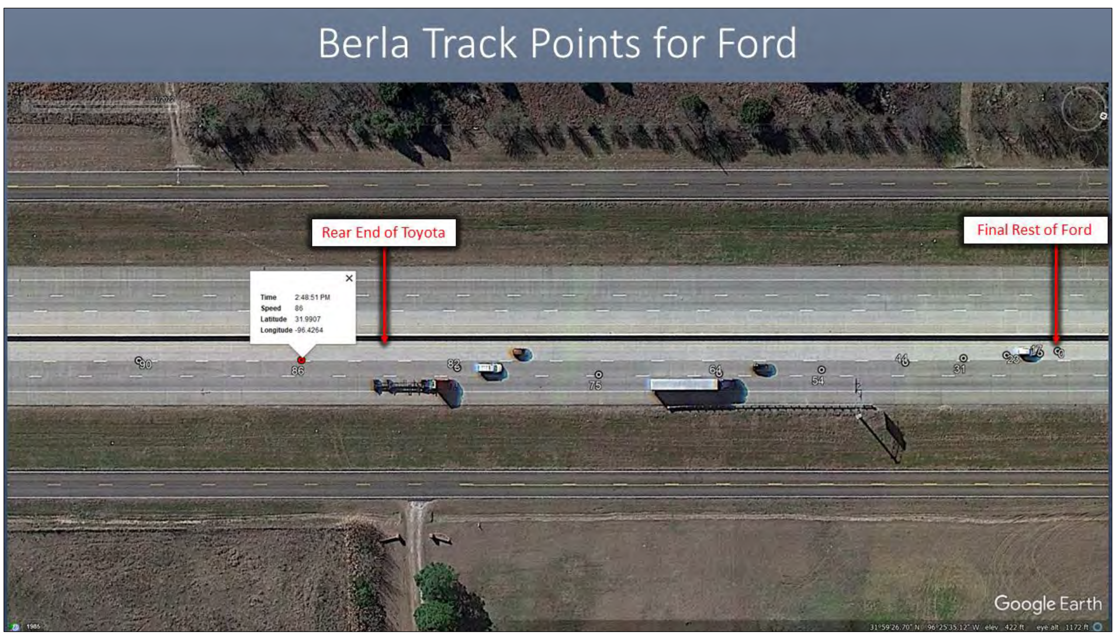

Figure 140: Time stamp just before collision.

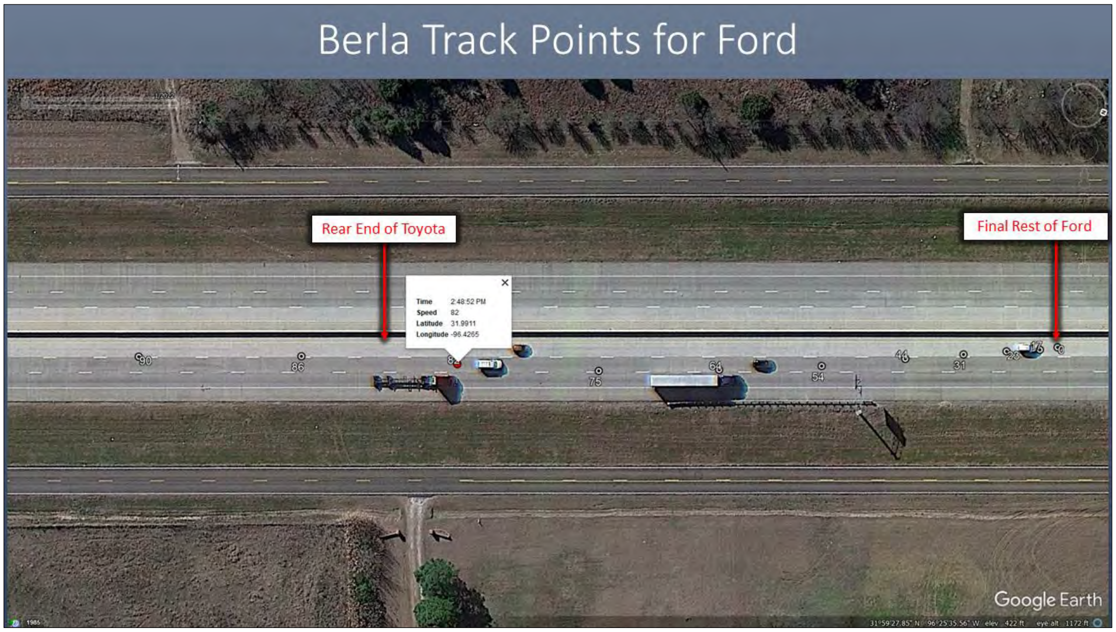

Figure 141: Time stamp just after collision.

Figure 142: Ford bearing data in degrees CCW from due north.

Figure 143: Ford bearing data in degrees CCW from due north.

Figure 144: Ford bearing data in degrees CCW from due north.

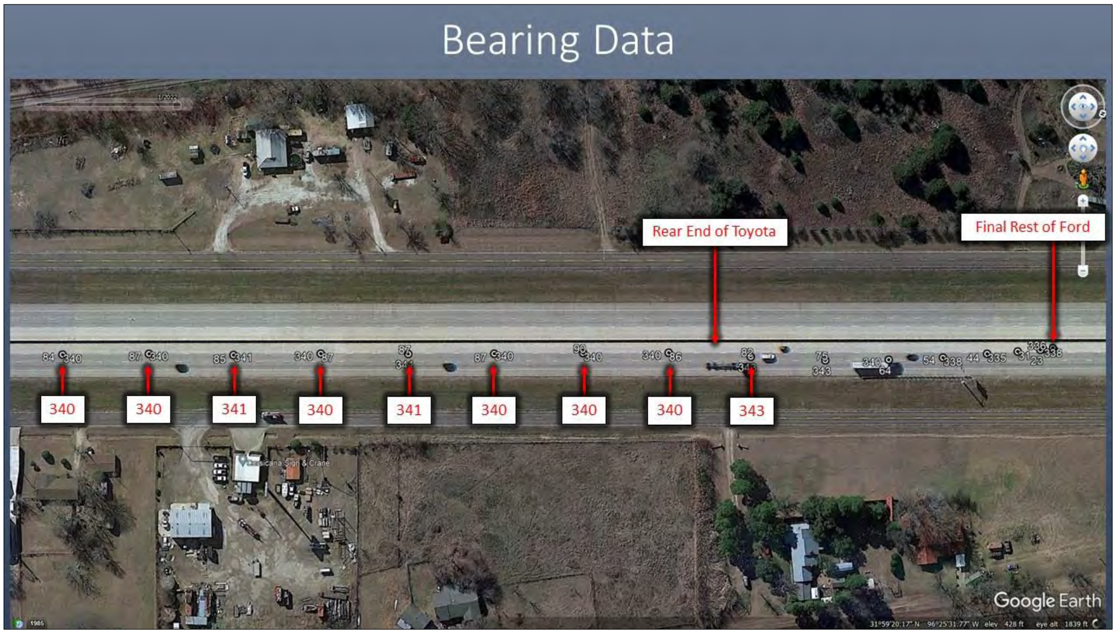

Figure 145: Ford bearing data in degrees CCW from due north.

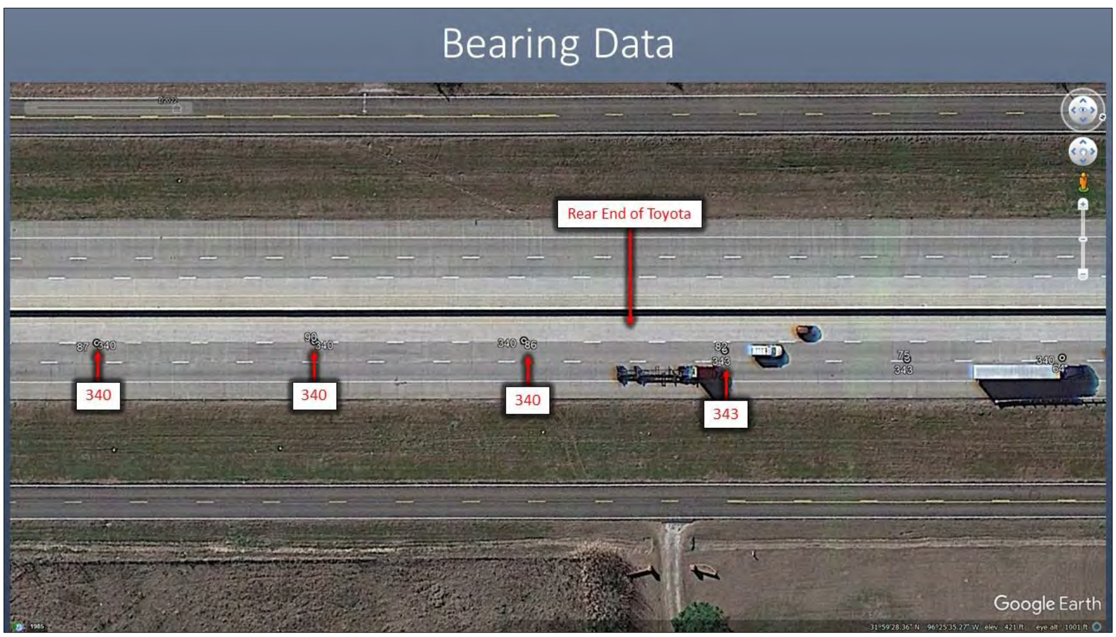

Figure 146: Ford bearing data in degrees CCW from due north.

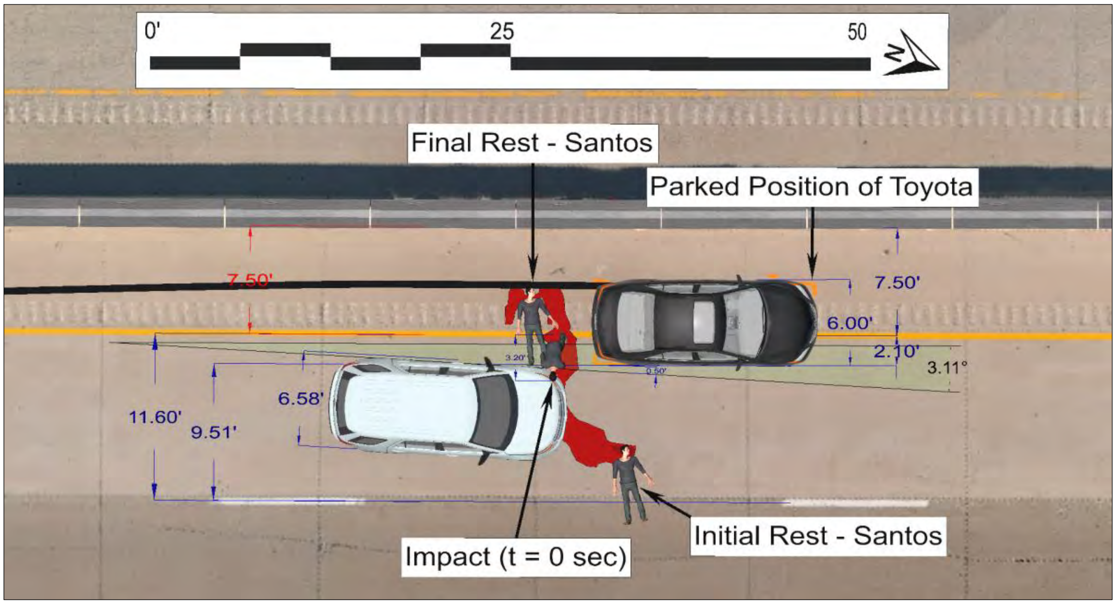

Figure 147: Plaintiff version.

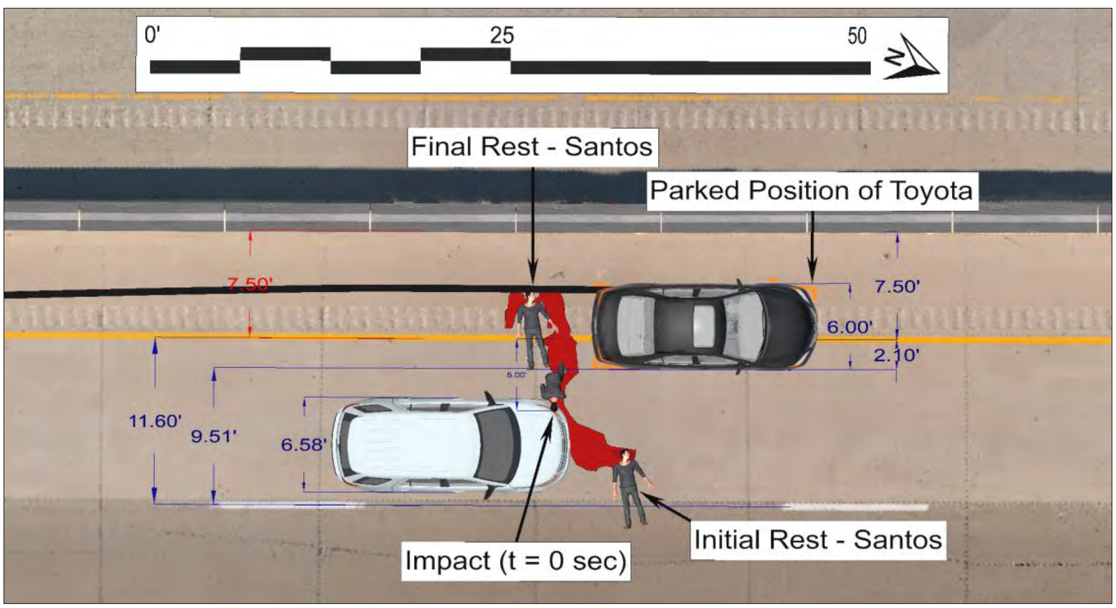

Figure 148: Defendant version.

EXHIBIT B

CONDENSED

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS

Civil Action No. 3:22-CV-02714-K

ERICK RODERICO PIVARAL GONZALEZ, Individually and as Special Administrator of the Estate of NEHEMIAS R. PIVARAL SANTOS, DECEASED, ERICK SANTOS, and EVELYN MORENO,

Plaintiffs,

vs.

CAYLEE ERIN SMITH & EASTMAN CHEMICAL COMPANY,

Defendants.

__________________________/

VOLUME I

DEPOSITION OF: PAUL J. MONTALBANO

DATE TAKEN: Tuesday, December 19, 2023

TIME: 10:12 a.m.

PLACE: Wingate by Wyndham
5750 Hazeltine National Drive
Orlando, Florida 32822

TAKEN BY: Plaintiffs

REPORTED BY: Jennifer Prohaska
Court Reporter and Notary Public

A P P E A R A N C E S:

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(479) 935-1761
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APPEARING ON BEHALF OF THE PLAINTIFFS

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APPEARING ON BEHALF OF THE DEFENDANTS

ALSO APPEARING:

VANESSA McCORMICK, Videographer

C O N T E N T S

E X H I B I T S

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S T I P U L A T I O N S

It is hereby stipulated by and between counsel for the respective parties that the reading and signing of the deposition be reserved.

P R O C E E D I N G S

* * * * *

THE VIDEOGRAPHER: On record. My name is Vanessa, and Jennifer is the court reporter. Today is the 19th day of December, 2023. The current time is 10:12 a.m. We are here to take the deposition of Paul J. Montalbano in the matter of Erick Roderico Pivaral Gonzalez, individually and as special administrator of the estate of Nehemias R. Piveral Santos, deceased, Erick Santos, and Evelyn Moreno versus Caylee Erin Smith and Eastman Chemical Company, pending in the District Court of the Northern District of Texas, Civil Action No. 3:22-CV-02714-K as in kilo.

Will Counsels please introduce themselves for the record, starting with the plaintiff's counsel.

MR. WHITE: This is Jacob White. I'm representing plaintiffs.

MR. DUBOFF: Gregory DuBoff representing Defendants Caylee Erin Smith and Eastman Chemical Company.

THE VIDEOGRAPHER: Thank you.

And for the deponent, can you please state your full name for the record?

THE WITNESS: Paul Joseph Montalbano.

THE VIDEOGRAPHER: Thank you. And can you please raise your right hand to be sworn in by the court reporter?

THE REPORTER: Do you solemnly swear or affirm that the testimony you shall give will be the truth, the whole truth, and nothing but the truth?

THE WITNESS: I do.

PAUL J. MONTALBANO,

having first been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WHITE:

Q. All right. We will begin. Will you state your full name for the record?

A. Paul Joseph Montalbano.

Q. Okay. Where are you employed?

A. Focus Forensics.

(Exhibits 1, 2, and 3 were marked for identification.)

MR. WHITE: And just for the record, we've already premarked them, the report as Exhibit 1, his CV as Exhibit 2, and --

MR. DUBOFF: Right.

MR. WHITE: -- his case list as Exhibit 3. We try and do this paper-light, you know. His

report already has most of the photos in it.

MR. DUBOFF: Sure.

BY MR. WHITE:

Q. Okay. When were you engaged by Defense Counsel in this matter? And would you identify for the record when you look at your laptop? If you have to consult a document to answer a question, it's fine if you do; just tell us what you consulted to answer a question.

A. Sure. So I'm looking at our retention agreement, which is dated April 26, 2023. So on or about that date is when we were retained.

Q. So just to make sure I got that: April 6th, 2023, on or about?

A. April 26th.

Q. 26th. Okay.

So I take it you've been deposed before, right?

A. Yes, sir.

Q. So you know the general ground rules. Oral answers, no uh-huhs or -- head shaking is fine, but accompany it with an oral answer.

So I'll skip sort of my general litany of rules, except for, can we agree that if I ask a question and you answer it, that that means that you understood my question?

A. Yes, sir.
Q. And if you don't understand one of my questions, just stop me and say, "Hey, man, I didn't understand that question. Try again."
A. Sounds good.
Q. Okay, perfect.
So this is also just for the record: You received a subpoena for this deposition, correct?
A. Yes, sir.
Q. And that subpoena asked you to produce certain documents, right?
A. Yes.
Q. And you have, before we went on the record, you've given me a USB drive with your entire file?
A. Yes.
Q. And you believe that that is responsive entirely to the document request that I sent you?
A. Yes. That is my entire file front to back.
Q. Okay, perfect, perfect.
And it includes a transcript either of your deposition and your trial testimony, or one or the other from the estate of Sari Marcus, correct?
A. Yes. It includes my deposition transcript. I was never provided my trial transcript, so I don't have that in my possession.

Q. Very good, very good.

MR. DUBOFF: And, Jake, if I could, so in talking with Paul, I think one interpretation of your subpoena would have required him to produce communications with Counsel.

MR. WHITE: Obviously, right.

MR. DUBOFF: Yeah, and so -- but I know -- I don't think there was anything, but my instructions are Paul to produce any communications to the extent they were relevant to any of his opinions in this case.

MR. WHITE: Right, right. And that's -- I think we agree there are certain communications with Counsel that are relevant. Some are --

MR. DUBOFF: Yes.

MR. WHITE: -- semi-privileged, and I take it your instruction was, "Provide the ones that are relevant and unprivileged"?

MR. DUBOFF: Correct.

MR. WHITE: Okay. Got it, got it. All right.

BY MR. WHITE:

Q. So let's take a look at your CV here for a second. Can you tell us what degrees you hold and from what institutions?

A. I hold a bachelor of science in mechanical engineering and a master of science in mechanical engineering from the University of South Florida.

Q. Okay. And when did you receive those degrees?

A. It was received simultaneously in 2013. I attended what they called an accelerated master's program where you could skip the bachelor's graduation and receive both degrees at the same time.

Q. So was that a four-year program, or was it, like, a combined six-year program?

A. A five-year program.

Q. Five-year program. Okay.

And can you tell us in general what you studied to receive that degree -- those degrees?

A. So my discipline was mechanical engineering. My specialties within mechanical engineering during my graduate research and graduate coursework were kinetics, kinematics, dynamics, and physics, which are all disciplines and studies of the motion of objects, how objects behave during impacts, predicting motion of objects based on impacts. Anything with movement, basically, was what I specialized in in my graduate studies.

Q. Okay. And do people get that degree, the

degree that you received and the training you received for your master's, in order to become accident reconstructionists? Or are there other professions that people get that training for?

A. Accident reconstruction has a broad range of foundational education. The core foundation is mathematics and physics, so anything that really provides you a great foundation of mathematics and physics is typically sufficient to go into the field of accident reconstruction analysis.

Since graduating with my graduate degree in 2013, I have taken 45 courses directly in the field of accident reconstruction and human factors, which directly applies the engineering principles and foundations from my college degrees directly to the field of accident reconstruction and human factors analysis.

Q. So have you referred to yourself before as a forensic engineer?

A. We have many titles: consultant, forensic engineer. I still am a mechanical engineer by trade. Forensic just means that I'm reverse engineering something that happened in the past.

Q. Okay. Is any one of those titles more accurate than another -- accident reconstructionist, mechanical engineer, forensic engineer -- as applied to

yourself?

A. I have no preference of which title I am. It all applies engineering principles to something that's happened in the past. We are reverse engineering something using math and science.

Q. Okay.

A. So all of those titles, I think, categorize that sufficiently.

Q. And I've seen -- and tell me -- this is sort of a mouthful. Have you ever called yourself an accident reconstruction forensic engineer?

A. I think so, yeah. Maybe not together, but yeah, accident reconstructionist --

Q. Okay.

A. -- human factors analyst, expert, a lot of different titles.

Q. So what -- and tell me if this question is based on a faulty premise. What are the three tiers of accident reconstruction?

A. What I think you're referring to is the HVE, is what we categorize it in an acronym. It's the human aspect, the vehicular aspect, and the environmental aspect. Those are kind of the three tiers that we analyze independently in an accident reconstruction analysis. You obviously have the vehicle, which is what

is engaging in the physics; you have the human component, which is applying the input to that vehicle; and then the environment, which affects how those objects behave during and after collisions.

Q. Okay. So -- and I think you've already summarized those for me. Do you look at both -- all three -- H, V, and E -- when creating an accident reconstruction report?

A. Typically, yes. It depends on the amount of available evidence. Sometimes I am able to provide more information on some cases versus other cases. It just depends on the available evidence that I have to me.

Q. So of the -- and I may be butchering the acronym -- of the HVE boxes, you don't look at each one of those boxes necessarily; just depends on what evidence you get in a given case?

A. I don't know if I would say that I really delineate the boxes versus just encompass them as a whole in my analysis.

Q. Okay, okay. So when did you receive your PE license?

A. 2016, I believe, the end of 2016.

Q. And which states do you have PE licenses in?

A. Florida, Georgia, Mississippi, and Alabama.

Q. Is the process for getting a PE license in

each one of those states the same?
A. Yes. It's simply paying the state the fees for reciprocity.
Q. So how many times did you have to take the PE test?
A. Just once.
Q. Can you describe the PE test?
A. The PE test is an eight-hour examination that fully encompasses all of the disciplines of the particular category that you choose to take. In my case, I chose mechanical systems, which includes, obviously, the physics that I use in accident reconstruction analysis, but it also includes heat transfer, HVAC, other various components of mechanical engineering. So it's a very broad encompassing test, but it just generally proves competency in the field of engineering.
Q. So do you -- well, can you describe your education involving fluid dynamics?
A. Fluid dynamics was a pretty extensive part of my coursework. I don't have any graduate experience in fluid dynamics. It is similar to aerodynamics, which could arguably be a part of accident reconstruction analysis. So in part, it does rely on the same generic physics principles, forces and motion, because you are talking about aerodynamic or fluid dynamic drag forces,

things like that. So the principles are all the same foundational principles; they're just applying it to a very specific aspect.

Q. Okay. And I mean, fluid dynamics can get pretty complex in the details of it, right? I mean, it's -- I know you said you've got coursework on it. Would you describe yourself as an expert in fluid dynamics?

A. Well, specifically how we think of it in layman's terms, fluid dynamics is anything in the water. Technically, I don't have specialized expertise analyzing submarines or boats, things like that. But again, the foundational principles of fluid dynamics is just the same core principles of physics and engineering.

Q. And I'm not trying to trick you. I take it you didn't rely on fluid dynamics when generating your conclusions in this report, did you?

A. Not in the way I think you're referring to it. Now, certainly, there are trajectories of things like fluids in an accident that I have considered. But what I think you're referring to is more mechanical design of systems that operate in water. No.

Q. Well, what I'm trying to get at is, did you rely on fluid dynamics when -- to the extent you did this -- when you calculated how, like, say, blood or bone

or brain matter was thrown? Did you do anything like that?

A. Not in regards to what I would say is fluid dynamics versus physics: trajectories, impacts, speeds, times, distances, angles, vectors.

Q. Okay, okay. Do you think that you need a background in physics in order to reach the conclusions that you drew in your report regarding, say, the fluids that were thrown, or the way Mr. Santos's body was thrown around?

MR. DUBOFF: Object -- object as ambiguous.

A. I don't think so. I've seen many reconstruction experts have backgrounds in civil engineering that are able to generally understand the concepts of physics. It's a basic principle, mathematical principle, that any mathematical discipline encompasses.

Q. So I take it -- and correct me if I'm wrong. Do you think that you need a background in mathematics in order to be an accident reconstructionist?

A. No. There are a lot of law enforcement that do not have any educational background that are able to perform accident reconstruction analyses based on direct education with regards to accident reconstruction.

Q. Okay. Can you describe your education

involving material sciences?
A. Same answer as fluid dynamics. I took extensive courses in material sciences in regards to, really, the macro level of the material components. So material science is very broad; I'm talking down to the finite material element components versus simple structural force calculations.
So you could certainly be a metallurgist that analyzes more on a chemical scale the structure of material; or on a more physics standpoint, the failure points of materials based on the force applications, the deformation of those materials based on force applications. So again, that question kind of can take you many different ways; just depends on which way you're actually asking.
Q. Well, I guess, do you consider yourself an expert in any of those types of material sciences?
A. Well, you certainly need to know material properties when you are doing any force equations applied to an object. So in a sense, yes, of course. Any engineering discipline relies on material properties.
Q. Okay. And did you do any calculations like that to generate your report in this case?
A. In this particular one, I don't believe the material characteristics came into any of the equations.

Typically, you'll find that in a crash analysis, is what we like to call it, when we factor in the force of an impact based on how much damage we see to a vehicle. Those types of methodologies don't necessarily apply to pedestrian impacts.

So in this particular case, I don't believe there were really any specific material engineering principles involved other than observations of how the damage transpired in doing a damage match, which is a foundational principle of accident reconstruction.

Q. Okay. So can you tell us -- for those of us that aren't engineers -- what the study of kinetics is?

A. Kinetics is the study of the motion of objects, how objects behave in the environment, speeds, times, distances, things like that.

Q. So again, for the nonengineers amongst us, I take it if I showed you how a billiard ball hit one other billiard ball, the study of kinetics would tell you how the billiard balls are going to move after impact?

A. Did you say "kinetics" or "kinematics"?

Q. I said "kinetics."

A. Okay. So I'm sorry. Kinetics is -- you're right: billiard balls is a great example of kinetics.

Q. Okay.

A. Kinematics is more of the motion of objects.

Kinetics analyzes the impacts.
Q. So -- so can you repeat that answer? I'm sorry. Let's go off the record.
THE VIDEOGRAPHER: The time is 10:28 a.m., and we're off record.
(Break was taken from 10:28 p.m. to 10:28 a.m.)
THE VIDEOGRAPHER: The time is 10:28 a.m., and we are on record.
BY MR. WHITE:
Q. Okay. So sorry, we had a brief interruption. Let's -- can you describe the difference between kinetics and kinematics?
A. In the most simple terms, kinetics is the study of impacts. Kinematics is the study of the motion of objects in time and space.
Q. Okay. So just let's go back to my billiard ball analogy. Kinetics is the study of how, when two billiard balls hit each other, what happens, right?
A. Yes.
Q. And kinematics is the study of, as a billiard ball rolls, I guess, how it's rolling or, like, what you can expect it to do?
A. Well said.
Q. Okay. All right. Just I don't know, right?

I just want to make sure.

So can you describe your education on kinetics and kinematics?

A. My education starts in my bachelor's degree. Kinematics and kinetics is a core principle of mechanical engineering. So there were courses titled kinetics; there were courses titled kinematics; there were courses titled dynamics, which is the combination of kinetics and kinematics. So those were very large foundational principles learned early on in almost any engineering degree.

In addition to that, my graduate research involved the exclusive study of the motion of objects and forces in my graduate research.

Q. Okay. And just to bring it into this case, have you studied, trained, or had work experience in the kinetics/kinematics of pedestrian interactions with motor vehicles?

A. In my professional experience, yes. Throughout my 45 courses taken directly in the field of accident reconstruction, pedestrian impacts are a large portion of what we analyze; so therefore, it's a large portion of the curriculum in any accident reconstruction course. And the foundational principles are kinetics and kinematics, but then they are applied directly to

pedestrian impacts with vehicles and also comparing that or using empirical test data.

Q. Okay. So can you describe -- so your postcollege and grad school experience with kinematics and kinetics as applied to pedestrian impacts?

A. Really, any pedestrian is going to rely on those foundational principles. Whether you know you're relying on it or not when you use the equations, you are. So the accident reconstruction curriculum gives you these equations established from empirical test data and studies that help us predict pedestrian movement based on various forms of impact configurations. And again, it's just going back to the foundational engineering principles of kinetics and kinematics, whether you know it or not.

Q. So what are those equations that you're referring to?

THE VIDEOGRAPHER: Can you move your mic a little bit? It's rubbing your tie. Pardon me. Thank you. Sorry.

BY MR. WHITE:

Q. Let me see -- let me see if I can remember my last question.

A. I think you said, What are those equations?

Q. What are those equations? Yes, thank you.

A. Typically, the most-used pedestrian impact equations are predicting vehicle speed based upon pedestrian throw. There are various types of equations used based on the type of impact configuration, whether it is a full-frontal impact, whether it is a low-fronted vehicle versus a high-fronted vehicle, whether it's a corner clip, or what we call a fender-vault-type orientation. There are various empirical equations that we can use based on the throw distance of a pedestrian to predict the speed of the vehicle.

Q. Now, did you have to do any of the calculations in this case?

A. Not in this case. The pedestrian actually subsequently collided with the parked Toyota and then back into the subject Ford, so pedestrian throw distance wasn't a variable available to us in this analysis.

Q. And you didn't need it, right, because we had electronic data on Caylee Smith's speed, right?

A. That is true.

Q. Okay. So when did you start working professionally as an accident reconstructionist?

A. January 2nd, 2013.

Q. Okay. And how many accident reconstruction reports have you generated since then?

A. Reports or analyses? I don't generate

reports for every case.

Q. Okay. Well, first, tell us the difference between a report versus an analysis.

A. So typically in Florida, we actually rarely physically write reports. Our analysis is typically communicated through a deposition or a trial. So I know it may be different in other states, so I just want to delineate when you ask the question with reports.

To give you a full comprehensive answer, I have performed thousands of accident reconstruction human factors analyses. Certainly, a fraction of those make it to a deposition or a trial where I'm communicating on record. But almost all of them result in at least communicating my findings to retaining counsel that hired me. All of them involve actually performing an engineering analysis based on the evidence collected.

Q. So -- but you don't always -- strike that.

How many reports have you generated like the reports in this case, if you know?

A. I don't have that teed up. Certainly, federal cases require reports, so there's been a handful of those that I've written. Sometimes clients want a report to put my findings on paper. I don't have an exact answer for you.

Q. Okay. All right. That's fine.

What -- roughly, what percentage of -- and we'll -- when I say "reports" or "analyses," let's just say let's take the whole universe of both here. So what percentage of the analyses and reports that you've written have been for defense versus plaintiff, if you know?

A. We don't track that other than on my testimony history list, which the last I counted was a good 50-50 split on my actual testimony. My estimation based on just overall being retained to perform an analysis is also a good 50-50 split between plaintiff and defense.

Q. And of the reports and analyses that you generated, any idea, roughly, what percentage of it involved pedestrian interaction with a motor vehicle?

A. That's a good question. I would say, could be up to 10 percent. There are various types of vehicular accidents we involve -- that we are involved in: commercial vehicle collisions, passenger vehicle collisions, pedestrian collisions, daytime, nighttime; there's so many different variables to every case. I would say a large portion of that would be pedestrian.

Q. Okay. Any of the reports or analyses that you're thinking of involving motor vehicles going over 80 miles an hour interacting with a pedestrian?

A. I can think of one off the top of my head, but I don't have the others teed up. But that's certainly happened.

Q. Okay. Well, the one that you're thinking of, can you tell us what you recall about that case?

A. It was a Mustang traveling, I think, almost 100 miles per hour when it struck a pedestrian crossing the road.

Q. Okay. Do you remember what your conclusions were in that case?

A. I have no idea. That was many years ago.

Q. Do you recall if you were retained on behalf of the pedestrian or the Mustang driver?

A. I couldn't even tell you that.

Q. Okay. So you don't remember anything else other than it was a Mustang going about 100 and a pedestrian?

A. That's all I can remember on that one. I'm just trying to think of high-speed pedestrian collisions. Certainly, I know there's others of the thousands I've analyzed generally in cases. But I just can't think of all of them. There's so many.

Q. Okay, okay. Has your expert testimony ever been limited by a court, that you're aware of?

A. No, it has not.

Q. Okay. So no Daubert rulings or anything like that?

A. No. Certainly, there's been attempts or motions attempted to be filed, but none have made it through --

Q. Okay.

A. -- even to be processed by a judge.

Q. How many times have you testified at trial, if you remember?

A. I want to say somewhere in the teens, maybe 15 to 20.

Q. Okay. Over, I guess, the last ten years?

A. Yes.

Q. Okay. Mostly in Florida, or all over the country?

A. Mostly in Florida. I have testified throughout the country, but most of it is Florida.

Q. Okay. So do you recall the case of the Estate of Sari Lynn Marcus versus -- there's some entities, but it's basically FedEx.

A. Vaguely, yes. I didn't spend any time reviewing that transcript you requested, but I vaguely remember the case.

Q. So -- and tell me if what I'm about to describe is inaccurate to your recollection, okay?

A. Sure.
Q. That was a case where there was a FedEx truck stopped on a two-lane residential road, and somebody passed the FedEx behind it, basically, trying to go around the FedEx truck. Does that sound right?
A. Yes.
Q. And then there was someone coming in oncoming traffic, or -- excuse me. I guess there was somebody coming in the other lane, basically, going to pass the FedEx truck, right?
A. Yes, in the opposite direction.
Q. In the opposite direction, thank you.
And that person lost control of their vehicle, striking some sort of utility pole, and they died, right?
A. Correct.
Q. Okay. So do you remember what your conclusions were about that case?
A. I had many conclusions; I don't know if I can summarize them in one sentence. But I do recall there being speed involved with that vehicle; I recall there being wet roadways; I recall there being an overcorrection of her vehicle, and that's all I can really recall.
Q. So was -- do you recall doing a calculation,

calculating that the driver that died was actually traveling 70 miles an hour on a residential road?

A. That sounds about right.

Q. Okay. And do you recall that the speed limit was about 45 miles per hour?

A. I don't have an independent recollection of that, but I'll take your word for it.

Q. Okay. So do you do what is called an avoidance opinion, I guess? Like, you basically provide analysis about what would have avoided an accident, right?

A. Depending on the facts of the case, yes. Sometimes I will analyze -- let me back up. I will independently change certain variables like speed to see how that would affect the outcome of the case.

Q. So do you remember opining that Ms. Marcus, the one that died, if she'd been traveling the speed limit, she could have reduced her speed when she saw the other vehicle get into her lane of traffic?

A. I do believe there was an opinion about that, whether she would have been able to stop before the pole impact, or maybe even be able to stop entirely before crossing the FedEx truck's path, I vaguely recall.

Q. Okay. So just to break that down, do you remember doing an analysis of whether or not, if the

driver that died had been going the speed limit, she would have been able to react in time to avoid losing control of the vehicle?

A. Well, I'll dissect that a little bit. It's not necessarily whether she would be able to react in time, but how much distance and time would she have had available to her to come to a complete stop.

Q. Okay, okay. So do you remember that your testimony there was that she had -- well, strike that.

Do you recall how far away Ms. Marcus, the one that died, was when she saw the SUV move into her path in that case?

A. I don't.

Q. Does it sound right if I tell you you testified that it was 309 feet?

A. I'll take your word for it.

Q. Okay. Do you agree that your testimony in that case was that 309 feet was sufficient to spot and avoid a hazard?

A. I vaguely recall that. However, that was an imminent identifiable hazard. So every hazard is different and needs to be analyzed differently in each particular case. And I would not compare apples to apples to the visual presentation of the hazard in that case to the visual presentation of the hazard in this

case.

Q. It was raining in that case, wasn't it?

A. It was.

Q. Okay. And that was a two-lane residential road?

A. Yes.

Q. Okay. So in that case, Ms. Marcus's speed was an important factor, right?

A. I wouldn't classify it as important or not. It was a factor.

Q. But it was -- you did testify that if her speed had been at the speed limit, that she would have had time to brake to avoid the hazard?

A. Yes.

Q. Okay. And that, according to your calculation, she would have had 309 feet in order to conduct that braking?

A. I don't know if it was to simply conduct the braking, or if that included perception response time and distance. I don't know the answer to that. But generally, that is what we try to look at is the available distance based on when the known visual hazard presented itself and analyze the time and distance based on that known.

Q. Okay. So you did calculate there how long it

would have taken -- strike that.

You did calculate in that case the distance required for the driver that died to come to a complete stop if they applied their brakes, right?

A. Yes, in response to the known imminent hazard.

Q. Okay. So what is that analysis called? Is that a braking analysis? I mean, that's just my little phrase for it.

A. You can call it a braking analysis, an avoidance analysis.

Q. Okay. Did you conduct a braking analysis in this case?

A. No, because I didn't have enough knowns. We don't know exactly when the imminent hazard presented itself, so I have nothing to base my analysis off of. In that case, the Marx case you're referring to, we had the hazard on video; we knew exactly when it presented itself and within the reconstruction timeline. So of course, if I have a known, I can reverse engineer from that known. When I don't have that known of when a hazard presents itself, I can't base my analysis off of anything.

Q. So when you say the hazard presenting itself in this case, are you talking about the -- Caylee seeing the Toyota or Caylee seeing Nehemias?

A. So there was actually two separate hazards that were presented to Caylee in this case. The first was the presence of the Toyota partially on the shoulder, partially in the travel lane. She responded to that by shifting over into her travel lane. We classify that as something called a potential hazard.

It's not something that requires an emergency response, but does likely require some form of a response, maybe a correction of speed or a lateral position, and that's what she said she did. She adjusted her lateral position to the right side of her lane.

Then a secondary imminent hazard presented itself, which is the decedent actively bending over into her path with his head directly into her path where it wasn't there before. That is the hazard I don't have any information on to quantify, so I am unable to perform an avoidance analysis on that, because I don't know when he bent over. What I can tell you is that the timing of that movement was likely short, and the available time and distance required to avoid that was likely greater.

Q. So I guess my question is, You didn't perform an analysis on how long it would have taken Caylee to brake to either come to a complete stop or significantly reduce her speed once she saw the Toyota, did you?

A. That is not a relevant analysis, because we

don't see people doing that in the literature. We don't see people locking up their brakes due to the presence of a roadside vehicle.

A good example I always like to ask is when is the last time you locked up your brakes and said, "Oops, never mind"? We don't respond in an emergency fashion unless the hazard is certain and imminent. Anything else, we classify as a potential hazard that just requires some form of an adjustment.

Q. So now, in this case, the car wasn't on the shoulder entirely, right? I mean, the car was partially in the lane of travel she was in.

A. About 2 feet.

Q. Okay. So you didn't think it was necessary to perform an analysis of how long it would take her to slow down when she saw a lane -- when she saw a car parked in her lane of traffic on the interstate?

A. Well, you say "parked." It's not parked in her lane. So it is partially obstructing her lane. There is a totally different analysis, totally different visual stimulus if a vehicle is obstructing her entire lane versus partially obstructing her lane where she can physically navigate through the gap.

We don't have an imminent hazard here that requires an emergency response. Again, we reserve

emergency responses for emergency imminent hazards, because there's risks associated to implementing a response. Locking up your brakes on a freeway is risky due to traffic behind you, so you're going to reserve that for the absolute necessary.

In a potential hazard where your lane may just be minimizing width by a couple feet, that doesn't require locking up the brakes. That just requires adjusting your lateral position to navigate successfully around that vehicle. And that's exactly what she did.

Q. So because you're categorizing the parked Toyota in the lane as a potential hazard and not an imminent hazard, that's why you didn't perform a braking analysis for Caylee?

A. Well, it's -- there's a couple explanations. So yes, number one, it was not an imminent hazard; it didn't require an imminent response. We don't see drivers locking up their brakes for roadside hazards. That's just not something drivers have been shown to do. So applying that analysis would be unfair because we are comparing what the literature and the studies actually show drivers doing versus what actually happened. And that's not what the studies show that drivers do.

Number two, we do see drivers adjusting their lateral position to that type of hazard, and that's what

Caylee did. So she is consistent with what the literature shows of what an attentive typical driver does, not only in her actual movement, but the magnitude of her movement to -- when facing this particular potential hazard.

Q. Well, so my question is, Because of the literature that you reviewed and the way you categorize the hazard created by the Camry, that's why you didn't conduct a braking analysis, right?

A. I think that's fair, because it's not applicable. That would be like performing a braking analysis to a threat that is not consistent with the research. We have to compare apples to apples. So if I'm going to apply a perception response time to a driver, I have to compare that perception response time to a similar hazard, because perception response times change drastically based on the visual hazard.

They can be very short, or they can be very long based on the characteristics of the visual hazard. So we really need to compare apples to apples to properly apply a perception response and avoidance analysis to our subject driver.

And that's what I did here was I compared apples to apples of what the actual hazard was to what the research shows drivers doing to that actual hazard.

If I applied any other avoidance analysis, it would be improperly applying the facts of the case to this particular case, because that's not what we have.

Q. So it's your expert opinion that a driver in Caylee's position would not apply the brakes or slow down when they -- as they approached a vehicle partially stopped in their lane?

A. Well, that question is a little different. You said "slow down." We were talking about emergency braking, coming to a complete stop before.

Q. I think you were talking about emergency braking. So let's talk about slowing down, all right?

A. Okay.

Q. So is it your expert opinion that a driver will not slow down as they approach a vehicle partially stopped in their lane?

A. That is not my opinion. My opinion on this particular hazard is that studies show drivers will typically slow down by 1 to 3 miles per hour, is what the cumulative studies show that drivers will reduce their speed by a few miles per hour, and possibly adjust their lateral lane position if necessary.

We see Caylee reducing her speed by at least 4 miles per hour. We had her speed at 90, then at 86, and then there was a gap before impact, so there very

well could have been additional speed reduction below 86.

So she did a speed reduction of at least 4 miles per hour and moved laterally by over 2 1/2 feet in her lane, which the studies show the average driver will move about 1.7 feet laterally in their lane to a roadside vehicle and pedestrian in one. So we see she did exactly what the literature says the average attentive driver does: They slow down and they move over.

Q. So did you cite the papers that you're referring to in your report?

A. The papers, I believe, are actually cited in there. I also included them on your thumb drive.

Q. Okay. Now, Caylee's speed reduction occurred -- and don't let me put words in your mouth -- one to two seconds before she struck Nehemias?

A. I don't know the exact timing, but I think two seconds would be fair.

Q. And is that -- does the literature support that about two seconds before you strike someone is when a driver will conduct the speed reduction that you're referring to?

MR. DUBOFF: Objection to the form.

A. It is consistent, because what the research shows is that drivers typically will take their foot off

the gas pedal. And so that speed reduction is as a result of the timing of releasing the gas and slowing down by 1 to 3 miles per hour. So arguably, she actually implemented her response sooner than the average driver in the research, because she reduced by 4 miles per hour by simply letting go of the gas.

Q. So you didn't -- did you offer an opinion about Caylee's speed in this case?

A. I provided an opinion of what her speeds were, of course.

Q. Okay. Do you think that her speed was a relevant contributing factor to the collision?

A. On an avoidance standpoint, no, because speed is a contributing variable when we can establish a baseline of when the hazard presented itself and compare that distance to the required distance to avoid at both the subject speed versus the speed limit. I don't have the time at which the hazard presented itself.

Q. So would it be fair to say that since you don't know when what you're calling the hazard presented itself, you don't know if her speed was a relevant factor?

A. I certainly cannot make a calculation in this particular case, because I don't have enough information.

Q. Okay. So do you agree that, all the other

facts unchanged that -- that you're aware of, the crash would not have occurred if Caylee Smith was traveling the speed limit?

A. Can you repeat that question?

Q. Do you agree that, all other facts unchanged, that if you had -- if Caylee Smith had been traveling the speed limit, this crash would not have occurred?

A. I cannot say that.

Q. Have you published any papers?

A. I have.

Q. Okay. What are they about?

A. It's been a while. I know the first couple of papers I published were based on my academia graduate research. I have published a paper in accident reconstruction about video analysis, analyzing pedestrian impacts to vehicles using photogrammetry analysis to calculate distances from those videos and from photographs. I believe that's probably the most relevant literature that I've published. I'd have to go back to my CV and see all the other --

Q. Sure.

A. -- literature.

Q. My understanding is you've published on the reconstruction of accidents using video evidence, right?

A. Yes. And photogrammetry, really.

Q. Photogrammetry, which -- and can you tell us what photogrammetry is?

A. Photogrammetry is a scientific method for calculating distances from either photographs or videos using known values within the photograph or video establishing vectors or lines from a camera to those known objects in the environment which fixes the camera in space, and then doing that same process to establish and calculate the unknowns in the video like final rest positions or fluid stains, volatile evidence using that same ray-vector analysis to then reverse engineer the positions of other objects.

Q. So just to use a simple example, if, like, there was a pitcher of water on the road that's going to evaporate, a volatile substance, right?

A. Correct.

Q. And you could measure some things in that photo by going to the scene, like two trees, right, you calculate that distance and then using some engineering magic, you can then figure out exactly where the water was located?

A. Yeah. I don't refer to it as "engineering magic," but I do like that now that --

Q. Sure, sure.

A. -- you've said that.

But it's like triangulation of satellites. It's the same concept. You're triangulating known points to establish positions.

Q. Okay.

A. When you have enough known points, you can fix the camera in the environment and extract other unknowns.

Q. Now, photogrammetry is not perfect, right? I mean, it's not as perfect as, say, laser scanning a scene immediately after it happened, right?

A. It depends. Every project has different tolerances based on the available data you're working with, the resolution of the photographs, the amount of photographs, the amount of knowns that you're working with. So it depends; every project is different.

In this particular case, I did establish my error rate or tolerance to these measurements. That is one large process of photogrammetry is understanding how accurate these points are.

Q. And is the error rate uniform for every photogrammetry calculation you make, or is it actually different for every particular photogrammetry calculation that you do?

A. It will be based on the area in the photo that you are analyzing.

Q. Okay. So every photo could be different?

A. It could.

Q. Okay. Do you have -- can you just tell us for the record what the error rate is on the photogrammetry that you did in this report?

A. Yes. Let me reference my report. So my computer turned off.

THE WITNESS: Can we go off the record?

THE VIDEOGRAPHER: The time is 10:56 a.m., and we are off record.

(Break was taken from 10:56 a.m. to 11:02 a.m.)

THE VIDEOGRAPHER: The time is 11:02 a.m., and we are on record.

BY MR. WHITE:

Q. So we just took a little break. I think we were in the middle of talking about your error rate on your report, and you were looking it up.

A. Yes. So you are correct: The error rate will be different based on what measurement I'm taking within the photo. What I like to do is establish the maximum error in all of the photos and all of the measurements so I know that everything is less than that. In this particular case, my maximum error or tolerance or accuracy was plus or minus a quarter of an inch on all of

my measurements.

Q. Okay. All right. So -- and I'm not an engineer. Would you call that a half-inch error rate, or would you call it a quarter-inch error rate? Because it could be a quarter inch in either way, so summed up, it's a half inch. Well, what would you call it?

A. Plus or minus a quarter of an inch. So it could be a quarter of an inch less than what I'm reporting or a quarter of an inch more than what I'm reporting.

Q. Okay. Got it. Thank you.

So do you speak on the issues of accident reconstruction at, say, industry conferences?

A. I have presented at a few, yes.

Q. Okay. Can you tell us about those presentations?

A. May I reference my CV?

Q. Yes.

A. So it looks like I have presented at various seminars about eight times over the last ten years. My most recent was back in 2021.

Q. Okay. So and the 2021 presentation was called "Evidence Collection Technology and Digital Data Sources in Forensic Engineering Reconstruction"; is that right?

A. Yes.

Q. Okay. Do you remember what the topic of -- or do you remember the substance of that presentation?

A. Oh, goodness. I don't know with certainty; but vaguely, I believe that was demonstrating all of our available tools that we have to collect evidence: laser scanners, cameras, drones, photo scanning, all the latest and greatest technology that we use in the industry.

Q. Okay. And if you can go down, it looks like you gave a presentation -- or sorry. Strike that.

It looks like you gave a presentation in 2016 titled "Maintenance of Traffic and Roadway Design Analysis"; am I correct?

A. Yes.

Q. Do you remember what that presentation was about?

A. That was more of an exhibit with my colleagues on -- more a transportation engineering aspect of the environmental aspect about the case, the roadway design, curvatures, radiuses, elevation changes, widths, things like that.

Q. Okay. So can I assume that you're familiar with, like, federal DOT or rules regarding traffic maintenance, or is that not your expertise?

A. That starts to go outside of my expertise as

far as Department of Transportation standards for roadway design.

Q. Okay. You are a human factors expert, though, right?

A. Yes, as it involves the driver and human aspect of an accident reconstruction. It's always worth mentioning, human factors is a very large field which includes things like designing the ergonomics of this chair that I'm sitting in, designing the location of buttons in your vehicle. It's a very broad field.

And the expertise that I hold is under the accident reconstruction/transportation umbrella, which is driver performance -- and I should say, really, human performance, because that includes pedestrians and passengers -- in response to hazards in the transportation environment. So not only what have drivers done, but quantifying the performance of those avoidance movements.

Q. So would you agree that traffic maintenance involves analyzing how humans interact with traffic?

A. I would imagine there is some human factors component to transportation engineering design, certainly with understanding how drivers respond to various signage, the locations of the signs. I think I can agree with that, yeah.

Q. Okay. So do you take continuing education classes?

A. Yes. They require a certain amount of continuing education to maintain my professional engineering license as well as my accident reconstruction accreditation from the ACTAR committee.

Q. How often do you have to take continuing education?

A. I don't remember the standards, because I end up taking way more than I need. I typically -- I take at least two courses a year.

Q. Okay. Since you graduated with your master's degree, have you always worked for Focus Forensics?

A. I've always worked in the accident reconstruction realm for the same boss. But Focus Forensics established in 2014. It branched off of Armstrong Forensic Engineers, which is the company I started with in 2013. So I've had the same boss for 11 years; it's just now a different company name.

Q. Okay. So have you or folks -- excuse me. Have you or Focus Forensics ever worked previously, before this case, for the law firm of Freeman Mills or McGuireWoods?

A. That sounds familiar, McGuireWoods, yes. I am very bad with names, so I apologize if I don't

remember something.

Q. So let's take them one at a time. Have you or your -- or your firm that you work for, have you ever previously been retained by Freeman Mills, the law firm?

A. Is that the same law firm as McGuire?

Q. No. It's different. That's the law firm in Texas in this case.

A. Okay. And then I guess my answer is, I don't know.

Q. Okay. But you do think that your firm or you have been retained previously by McGuireWoods?

A. Yes.

Q. Okay. Do you know how many times?

A. I don't have that readily available or even if it's documented anywhere, but I would guess less than five. I don't know.

Q. Do you recall which cases those five were?

A. I'm so bad at remembering this, I don't.

Q. Okay. Do you remember if those were defense cases, plaintiff cases?

A. I think they're a defense law firm, so presumably defense.

Q. Okay. Have you ever -- or Focus Forensics, to your knowledge -- ever done work for Eastman Chemical Company before?

A. That's the underlying carrier underneath? Yeah, I don't know. It's more so I don't know for that question because we don't always know the underlying carriers. We are retained typically by counsel, sometimes the insurance companies, so I don't always know the hierarchy of involved entities.

Q. Okay, okay. What hourly rate are you billed out at?

A. 2023, Focus Forensics is charging $280 per hour for my standard time and I believe $400 per hour for my testimony, but let me double-check that. Yes, I was correct: $280 per hour for standard time, which is engineering analysis, inspections, travel to and from locations; and then active testimony like depositions or trial testimony is billed at $400 per hour.

Q. Okay. But you actually are not paid by the hour; you receive a salary?

A. Correct. I'm a salaried employee by the engineering firm.

Q. Okay. And what is your salary with Focus Forensics?

A. I am not able to disclose that information.

Q. Are you refusing to give that answer?

A. Yes, I am.

Q. On what basis?

A. That is confidential. It has no basis for the engineering work performed in this case. It has no relevancy to the facts of the case or my engineering analysis. My income is irrelevant of anything related to this legal case, regardless of the outcome of the case, regardless of my findings. My salary has no basis for anything involving my work performed on this particular case. It is also confidential. I am instructed by my employer to not disclose that.

MR. WHITE: So are you instructing him, Greg, not to answer that question?

MR. DUBOFF: I mean, it's not privileged, but I'm not going to tell him to answer it. And if he -- I guess I'm not going to tell him to disregard what his employer has told him. If you want to have a fight about it with the judge, then we can do that.

MR. WHITE: Okay. So fair enough. Right.

BY MR. WHITE:

Q. Just for the record, you're not going to answer that question based on your opinion that it's not relevant and your employer's instruction?

A. That's correct.

Q. Okay. How much has Focus Forensics billed the defense in this case as of today?

A. The last I looked when I added all the invoices, it was just under $15,000.

Q. Okay. Did Defense Counsel give you any assumptions to use --

MR. DUBOFF: And again, Jacob -- I mean, I can do it at the end. But if you just want to clarify, I know he -- I know Mr. Montalbano just said it, but if you want to ask -- if we're going to have a fight about this, I'd rather just have a complete record if you want to ask him about whether there's any contingency to any -- if his salary is based in any way on anything having to do with this case.

MR. WHITE: Okay, yeah, let's get that out of the way just so we don't have to revisit it down the road.

BY MR. WHITE:

Q. Is your salary with Focus Forensics contingent on any outcomes of any of the cases that you work on?

A. Absolutely not. And that's why it's not relevant, and that's why I'm instructed not to provide it, because it has absolutely no relevancy to the engineering work I perform. I'm a salaried employee. We charge hourly. Even Focus Forensics' income is

irrelevant of the outcome of the case, whether it's good or bad for the retaining counsel that retained us.

We charge hourly for the time it takes us to perform the work. So the outcome of cases, the type of analysis that I'm performing is entirely irrelevant to not only Focus Forensics' income but my personal salary with the employer I work for.

Q. So do you receive -- and I'm not asking you an amount. Do you receive a bonus at any point?

A. There is a bonus structure based on efficiency.

Q. Okay. Do -- and otherwise, you're generally paid as a salaried employee, which I take it means you receive the same amount every month or whatever the pay schedule is?

A. Correct.

Q. Okay. Do you own equity in Focus Forensics?

A. No.

Q. Do you own equity in any entity that owns a portion of Focus Forensics?

A. No.

Q. Okay. Did Defense Counsel give you any assumptions to use in your report in this case?

A. Not that I can think of. If there were assumptions that I relied upon, I would have presented

them in my report.

Q. Okay. And we'll go through your report here in a little bit.

Do you remember any assumptions that you made?

A. Everything I do typically relies on the physical evidence and mathematical calculations. Certainly, there is conflicting testimony that I'm aware of that I have considered, so technically, those can be regarded as assumptions that I've considered. But I certainly try my best to establish -- if I'm relying on testimony or an assumption, then I will say it.

Q. Have you made any credibility determinations when reviewing witness statements to determine which set of facts you're applying to this accident?

A. Fortunately, that's not my job. I'm not allowed to do that. I consider all testimony entirely and compare it directly and objectively to the physical evidence and the physics involved. It's up to the jury to determine credibility.

Q. What do you do when one witness provides contradictory or inconsistent statements when generating a report?

A. I will mention it that their testimony or statement is inconsistent with the evidence or the

calculation, whatever engineering foundation that I have to compete against their testimony.

Q. Okay. Do you recall in this report ever mentioning whether some -- whether the one witness provided different inconsistent statements?

A. I believe there's a lot of inconsistent statements. I think you'll need to be more specific on that.

Q. Well, yeah. I'm talking about when one witness -- like, the same person -- says one different -- different things at different times, contradicting themselves.

A. I would need an example. I know that, just on my experience, particularly when witnesses are deposed by attorneys that ask questions in varying types of way, and in varying types of way, sometimes the answer could be slightly different depending on how it's asked. You'll have to be more specific; I'm not sure.

Q. Okay. But you don't recall mentioning inconsistent statements where someone contradicted themselves in your report?

A. Yeah. It's not something that I need to bring forth to the jury. They are capable of finding those inconsistencies. What my job is is to analyze everything as a whole and compare it to the evidence.

Q. And as far as you know, you haven't picked amongst any individual witnesses' inconsistent statements and chosen which statement you relied on?

A. Correct. I don't choose what I rely on in regards to testimony, because it's obviously in dispute. Now, what I can establish is whether it's consistent with the science or not. And that's really how I can assist the jury in helping them resolve that dispute in any inconsistencies, not only in the same witness but also between other witnesses.

Q. Okay. Thank you.

So you said earlier you were retained on -- or Focus Forensics was retained on August 26, 2023, right?

A. I thought it was April, but let me double-check.

Q. Oh, I'm sorry. I may have my A months mixed up.

A. April 26, 2023.

Q. Okay, perfect. Thank you.

When did you start engaging in work in this case?

A. Let me reference the first invoice. Looks like I charged a half hour for intake of case materials on April 26, 2023.

Q. Okay. And can you describe -- well, strike that.

Did you or anyone at your firm physically inspect the Ford Explorer in this case?

A. No. We -- or I should say I relied on the inspections that were performed by others.

Q. Okay. And do you know who performed the inspections that you relied upon?

A. There were two companies. One company had a name change. So CAC is now Aperture, I believe; and then there's Axiom Engineering.

Q. And fair enough. Axiom is the accident reconstruction company that Plaintiffs' side has hired.

So you relied upon the photos and everything else that Axiom took of the Ford Explorer as well as -- let's call it CAC for now. Those are what you relied upon, right?

A. Yes. I relied on their inspection materials, the same as I rely on the inspection materials of my colleagues that assist me in inspections that are more local to the physical location of the inspections. It's a very common thing in our industry to have assistance with inspections to keep costs down so that way we're not traveling so far. We're scattered throughout the state on purpose, so that way we can be efficient in collecting

evidence.

Q. And can we agree, if I say "CAC" or "Aperture," we agree that's the same thing?

A. Yes.

Q. Okay. So do you know when CAC performed the physical inspection of the Ford Explorer?

A. I do have the date in my report, if I can reference that. And I'm sorry. That was the inspection of the Ford, you asked?

Q. Yes. And if you don't know, I mean, that's a perfectly --

A. I don't know off the top of my head. I can certainly search the report. I do believe it's in there though.

Q. Okay. Does -- if I tell you that it happened sometime in September of 2022, do you have any reason to contradict that?

A. No. I actually just found it: September 6, 2022.

Q. Okay. And do you know what CAC did to inspect the Ford Explorer?

A. They photographed it, laser scanned it, and performed an ACM download and an infotainment system download.

Q. Okay. So you're relying -- and correct me if

I'm wrong. Are you relying on the photos and scans done by CAC?

A. In part, yes. That is part of the puzzle pieces I was provided to paint the picture of what happened.

Q. Okay. So how did you verify the accuracy of CAC's photographs and laser scanning?

A. The photographs appear to not be tampered with; they were consistent with both companies' inspection photographs of the Ford, Axiom and CAC. The accuracy of the laser scanning, actually, I relied on what's called their photo scans, which is a series of photographs that they take walking around the vehicle, and I can stitch those photographs together to establish a 3D model and generate those error rates myself so I can know the accuracy of that model on my own. So I processed their photographs in a 3D model of the Ford myself.

Q. So what software did you use to generate the 3D model?

A. Pix4D.

Q. Okay. So you did the Pix4D analysis; you did not receive one from CAC?

A. That is correct.

Q. Okay. So when someone else -- well, strike

that.

Is it your practice to typically allow someone else to do the vehicle inspection and then rely upon those photos?

A. Quite common.

Q. Okay. Is it your regular practice to allow, like, a totally unrelated entity unrelated to Focus Forensics to do the initial inspection?

A. Actually quite common, yes. We subcontract other engineering companies out often that are closer to the inspection locations.

Q. Okay. Have you or your firm or anyone from your firm done a site visit on Interstate 45 where this collision occurred?

A. Not personally. Certainly, by the time we're retained, all the evidence is gone. The site was thoroughly documented, both photographically and by drone mapping shortly after the crash. I believe it was six months after.

Q. Do you -- do you know who did the drone mapping?

A. I believe that was CAC.

Q. Okay. So just to -- just to be certain, no one from Focus Forensics has been to the scene of this accident?

A. Correct.
Q. Okay. Now, you said that there was an ACM download and an infotainment download done by CAC --
A. Yes.
Q. -- right?
A. Let me rephrase that. I think there was some cooperation between Axiom and CAC with the downloads, so I don't know specifically who plugged into it, but there was -- it was teamwork.
Q. Fair enough, right? That's not a trick question, right?
Have you reviewed -- well, I guess I should -- let me back that up.
What have you reviewed from ACM in the infotainment center download?
A. All of it.
Q. Okay. So when you say "all of it," with respect to the infotainment module, what do you mean?
A. There was various types of data. There was, most notably, the breadcrumb trail of the Ford and the 40 miles, I believe, leading up to the collision location at one-second intervals providing speed, bearing, and GPS coordinates. There was also text and call records that were recorded through the Bluetooth connection of Caylee's phone to the infotainment system. There was

some other GPS reported information such as vehicle starting points and synchronized clock points, but those were part of the peripheral information.

Q. Who provided you with the infotainment center download?

A. I believe it came from my client.

Q. Okay. So when you say "from the client," you mean Defense Counsel?

A. Yes.

Q. Fair enough.

So the infotainment module data that you reviewed, does it only include, like, say, two hours before the collision? Is that what -- that's the version you've looked at?

A. I believe two hours sounds right. It certainly has limited memory, so I believe that was all it had was two hours or 40 miles. I'd have to reference the report for the exact numbers.

Q. So -- and just to get super specific, it was a report that you reviewed, and it's a PDF that, like, has rows showing each track log point? Is that what you've looked at?

A. That is one of the files that was provided, yes.

Q. Were there other files that you were

provided?

A. I think there was a .CSV file, which is an Excel table --

Q. Okay.

A. -- on those data points.

Q. Do you know if that was generated from the infotainment module, or if that was something separate?

A. That was from the infotainment system.

Q. Okay. Any other files that you reviewed from the infotainment center?

A. Since you're getting specific, let me go ahead and open up that folder just to correctly answer this question. So yes, there are two files related to the infotainment system data. There was a PDF titled "Berla Report"; and then there was a .CSV file titled "Berla Download Track Points."

Q. And is this -- is this part of what you've given me on this thumb drive?

A. It is on there.

Q. Can you just kind of walk me through -- I can get there. Is that in the download data folder?

A. Yes. So under "Materials Received," then under "Download Data," then under "Ford Explorer," then under "Infotainment Data."

Q. Got it, got it. Okay.

So do you know, from your review of the infotainment center, infotainment center module -- whatever we're calling it -- do you know where Caylee Smith went the morning of April 30, 2022?

A. I do recall mapping that on a map. I don't have that teed up off the top of my head, so I'd have to go back and look at those GPS coordinates. But it -- I vaguely remember it was some type of plaza with shopping plazas and restaurants maybe. I'm not sure.

Q. Okay. So do you recall that she -- she started the Ford Explorer that morning in -- at her home in Livingston?

A. I recall seeing it started at an address, then it went to some commercial property parking lot, and then on its way to the crash location.

Q. So do you recall that one of the locations she went to was a hotel in Houston?

A. I didn't get that detailed to know if it was a hotel. I'd have to recheck those GPS points. I was more focused on the actual crash.

Q. Okay, okay. So how do you derive speed data from the infotainment center module that you were given?

A. How do I, or how does it do that?

Q. Well, let's start with you. Tell me how you derive speed data. And I ask that question because it

looks like from the PDF and -- the PDF and the Excel that it doesn't explicitly have the speed data.

A. So the PDF and Excel file were -- did provide various types of data. The PDF only provided the GPS coordinates with actions, then that was under the events. Then under Track Points, it provided GPS coordinates with bearing data, which is the orientation of the vehicle relative to north. Then the .CSV file is what contained the speed data.

Q. Okay.

A. So I had to actually combine the two.

Q. Okay. So now, from the PDF file, which was all Plaintiffs' Counsel was originally provided, for every track point, it tells you the distance that she went in a second, right?

A. Yes.

Q. And if you know how many feet someone traveled in a second, you can derive their speed as a mile per hour, right?

A. Yes. That is all GPS-based though. It's just the point at two positions when the GPS pinged it. The speed data in the CSV file, my understanding is it's pulling it from the CAN bus, and that's the actual network from the vehicle reporting the speed.

Q. Okay. All right. So then -- and that's the

information we need.

So the speed column on the .CSV file is not a GPS derived speed; it is directly pulled from, I guess, the altimeter on the Ford Explorer?

A. That is my understanding of infotainment system data is that it is pulling the data from the vehicle.

Q. Okay, okay. Thank you.

So have you ever done a -- or strike that.

Have you ever used Berla to pull data and run a report off of an infotainment center?

A. Yes. It's costly, so it's not as frequent as your traditional black box download. But yes, it is a rather large part of our industry now with this technology in these vehicles.

Q. Okay. So can you walk me through -- say a client asks you, "Hey, we want to download the data from the infotainment center. Use Berla and run a report." Have you done that?

A. So we actually outsource the physical downloading process. The software and equipment is rather expensive, and the times when we actually need the data is far and few between, because we typically will rely on the standard black box download --

Q. Okay.

A. -- that gives us a much higher resolution around the crash time, which is what we're actually focused on. So anytime that we want to get Berla data, I will outsource it to a company to download for me and then provide me the data.

Q. So you don't have any personal experience running a report using Berla?

A. Not the physical extraction. It does require training through Berla to be able to do that with their equipment.

Q. So separate from the physical extraction, have you ever used Berla to generate a report based on a download from an infotainment center?

A. So not to be nitpicky, but you used the word "report" again.

Q. Yeah.

A. Yes, I have -- well, I've used infotainment system data many times in accident reconstruction analyses. I don't know if it's ever made it to a physical hard paper report.

Q. Okay. Well --

A. It's like I said --

Q. Yeah, yeah, fair enough, right? And I don't care if it was physical hard copy or not.

What I'm trying to figure out is, Have you

ever used Berla to interpret the data that's pulled off of a module in order to figure out, for example, GPS coordinates or speed?

A. Yeah.

Q. Okay. Can you walk me through what that process looks like?

A. Yeah. It's the same process I utilized in this case. It's I look at the data. In this case, it was provided in two different formats, an Excel file and a PDF, both containing various types of information. The Excel file has speed --

Q. Well, sorry. That's actually not what I'm asking. I'm not -- I don't think you're being disingenuous; I think we're just misunderstanding each other.

Before you get the PDF and the Excel, have you ever been part of the process to generate the PDF and the Excel report using Berla?

A. Oh, no. That's part of the extraction process.

Q. Okay.

A. That's what we outsource.

Q. Okay. You outsource that bit. Okay. Sorry. That's -- we were just a little confused there.

So I just want to make sure: So physical

extraction of the data and the creation of the PDF or the Excel, whatever file interprets the data, that all happens at the same time?

A. My understanding, yes.

Q. Okay.

A. I believe it's a very lengthy process, or it could be.

Q. Okay.

A. Some of these downloads can take 24 hours of straight downloading, so they'll often run them overnight.

Q. And your understanding is that either CAC or Axiom did the extraction in this case?

A. Yes.

Q. So you were provided -- you actually got the PDF and the Excel from the infotainment center from Defense Counsel in this case, right, not from CAC?

A. Yes, I believe everything went through Defense Counsel. I have not had any direct communication with other engineering firms.

Q. Okay. So what information can you get off of a SYNC Generation 3 infotainment module?

A. So that's a very specific question with a very specific generation that will have a different answer versus other manufacturers and other generations

of those manufactures. So that's not something I have teed up off the top of my head. I'd have to go reference the Berla reports that tell you the manufacturer and generation, what to expect. They're all different, just like black box data.

It's hard to answer a blanket question of what type of black box data you would get from an air bag control module, because it's different for every year, make, and model. Same thing for Berla: It's going to be different for every year, make, and model. I would have to go reference the reports.

Q. So I -- so the data that gets pulled is different by make, model, and generation of the infotainment center, if I understand your answer right?

A. Could be, yes.

Q. Okay. So have you studied the specific accuracy of the data pulled from this type of infotainment module from this Ford Explorer?

MR. DUBOFF: Objection to the form.

A. Yes. There is actually a paper specifically to this generation of the module validating the accuracy of the data.

Q. Okay. So when you -- and do you remember who authored that paper?

A. I'd have to reference it in my file. I don't

have that teed up.

Q. Was it Wes Vandiver?

A. Again, I'd have to -- can I reference it?

Q. Sure, sure.

A. Yes. I have three papers. Two of those are from Wesley Vandiver. One is from William Bortles.

Q. Okay. So do you recall what the error rates are on the GPS data from a SYNC Generation 3 infotainment module?

A. Are you talking about the speed data or the GPS coordinate accuracy?

Q. The GPS coordinate accuracy.

A. Looks like plus or minus 5 meters.

Q. So I guess, let's use your engineering magic for an American audience. Plus or minus 5 meters, how many feet is that?

A. So I referenced this in my report. What I ended up doing was actually combining all three of these papers and their reported accuracy of these GPS points to give a range. This range is going to heavily rely on various environmental components like number of satellite dishes that are connected, any environmental physical obstructions like buildings or trees. Even speed of the object can affect that.

My report, I believe, indicated a 3- to

7-foot accuracy, but let me double-check that. Yes, 3.5 to 7.5 range in accuracy of the global position of the GPS coordinate. Now, that is the global position based on the general environment that you're in at the time of the evidence or sample collection.

What you can do is establish more certainty within that data by doing a relativity analysis, where if we know a sample of points were taken in the same environment, the global offset of all of those points are generally going to be the same and have the same error rate relative to global positioning.

And what we can do is track the difference between those individual sample points that were taken very close in time together within the same environment, within the same speed, within the same settings that were individually collected to further analyze whether there's any change in the subsequent events or points to see if we can track trends, and we can more heavily rely on the accuracy of those trends versus the global accuracy of the points.

Q. So -- and tell me if I'm wrong about this. If I convert that into layman's terms, are you saying that you look at the different GPS track points, and if -- as long as they look more or less like they're -- like, there's not one that's weirdly, like, you know,

20 feet off or something in what is otherwise a straight row, you -- you would understand that to mean that the track points are generally accurate?

A. Yes. If they are collected in the same environment and generally the same conditions, you could form trends from a cluster of GPS points to establish the accuracy relative to the prior points, so the theory of relativity. The global accuracy, yes, 3 to 7 feet, 3 to 8 feet. But the theory of relativity says that if you take a sample point close in time to the prior sample point, you can assume the same accuracy within each of those subsequent points and rely --

Q. Relative to the prior one?

A. Yes.

Q. So for example, if you see a bunch of GPS track points from this infotainment module and they're all in a straight line, you take that to mean the vehicle was going in a straight line?

A. Generally, yes, right.

Q. But you would not say that precisely where each one of those GPS points is precisely where the Ford Explorer was at that time, right?

A. Correct, because then you could also have some error based on how it overlaid onto the Google Map, certainly. Different Google Map dates have some offsets

in the global position of the road width, so that's really where that 3- to 8-foot margin comes into play is the global positioning of these points. But Newton, with the theory of relativity, helps us establish more accuracy based on taking smaller time samples.

Q. So how did we get from 3- to 8-feet versus Wes Vandiver's paper which says that the accuracy is plus or minus 5 meters?

A. So that is the worst case. That is taking the -- I guess I can call it the 95th percentile accuracy. That is the worst that's ever been reported based on various environmental changes. So when considering GPS coordinates as a whole, you do need to consider how the GPS coordinates are taken. That paper is a more conservative estimate of plus or minus 5 meters of the position as a whole, which is going to be 15 feet or so.

Q. Okay. So did Wes Vandiver provide percentile accuracies in his paper?

A. Yes. 95th percentile.

Q. Okay. So what did he say the 95th percentile is?

A. Plus or minus 5 meters.

Q. Okay. So what are the -- can you give us the 50th percentile? Did he report that?

A. I'd have to double-check the paper.

Q. And just to -- are you checking the 2021 paper?

A. Yes, 2021-010903. And I apologize; I was actually reading the wrong values before. Plus or minus 5 meters was for the VBOX Sport performance meter that they used to validate the data. I do need to dig deeper to see what the results were of this generation module, which I am doing now.

Q. Well, and I don't want -- I don't mean to make you read the paper. You can do that on a break.

Would you agree that this paper is the most thorough discussion of the GPS tracking done by the Gen 3 SYNC module that you have cited in your report?

A. I think that's fair.

Q. Do you think it's fair to rely on this paper as good science as far as the accuracy of the Gen 3 SYNC module?

A. Yeah, I think it's fair to rely on any peer-reviewed published literature, but it also needs to be considered as a whole. And considering the specific test conditions that they were under, I'm actually starting to see that this report was more based on the variance of distance between points versus the global position of the points.

So it's not necessarily comparing apples to apples of what I reported as the 3 1/2-to-7 1/2-foot error. So my reference is based on the combination of all the typical GPS accuracy peer-reviewed literature. This one does seem to have a specific goal in mind of providing a value of distance between points.

Q. Okay. So when you provided the 3-to-7-foot error rate, that's based on your general knowledge and expertise of the accuracy of GPS systems?

A. Along with my other cited literature on GPS accuracy.

Q. Okay. So which other cited papers support your 3-to-7-foot error rate conclusion?

A. So I referenced three papers. One was SAE 2017-01-1437. That was by William Bortles in 2017. I then referenced the Wesley Vandiver paper in 2018 and the Wesley Vandiver paper in 2021.

Q. Okay. So I think we agree that the 2021 paper is, at least at first glance, not entirely helpful on the question of the GPS error rate, right?

A. Well, it's reporting a different value than what we're talking about. It's reporting the error between a distance of two known points.

Q. Okay. So in Wes's 2018 paper, what does it say the error rate is for the GPS tracking?

A. I'm going to have to read this paper through. I know when I wrote this report, it was a combination of all of these papers. But if you give me a second, I can certainly read through this paper again.

Q. Sure.

A. I believe this paper is more so discussing the error of speed.

Q. So I think that's correct.

So then, I take it what you're really relying on is the Bortles paper, which does say that the GPS unit data error ranges from 3.5 to 7.5 feet. Am I incorrect about that?

A. I'm not sure. I'd have to reread the papers to see.

Q. If you go to Page 2 of that paper, I think it's about bottom of the first full paragraph.

A. Oh, yes, there you go, the coordinate location accuracy.

Q. Okay. So do you remember what module was being tested in the Bortles paper?

A. I'd have to review it again. So that one, I believe, was a Garmin GPS unit.

Q. Okay. Do you see anywhere in that paper where a SYNC Generation 3 module was tested? And I'm talking about the 2017 Bortles paper.

A. Looks like -- looks like it did a Generation 1, 2, and 9, and 10. So there's a -- looks like a large sample of generations.

Q. But there's no Generation 3 SYNC module included in the paper, right?

A. No. It spanned Generation 3. It's 1 to 10.

Q. Okay. So but not -- it didn't include Gen 3?

A. I'd agree with that specific.

Q. Okay. So did any of the papers that you cite test the GPS accuracy as an actual locational value from a Gen 3 SYNC module?

A. There's so many papers out there that I'd have to go back and reread them. I don't have that teed up off the top of my head to know about the specific GPS accuracy. What I can say is that general GPS accuracy is a very heavily-studied science, and it is well understood that the accuracy is going to be heavily dependent on the environmental conditions.

And generally, an accuracy of 3 to 8 feet is accepted within the industry of general GPS devices, whether it be a handheld Garmin or a SYNC module. The values reported in these papers may not be apples to apples. They're talking about various different types of variables they're assessing.

But in general, overall global GPS accuracy

is very well-known and studied, and that's -- the typical value we accept in the accident reconstruction community is somewhere in that 3-to-8-foot range, which is enough to establish the position of the vehicle on the roadway, but the exact lane position is not something with enough precision to rely on. But again, we go back to that theory of relativity where we're analyzing the small time change between data points.

So in this particular case, I can see that the overall accuracy of the GPS data is unreliable as far as its global position. But again, the theory of relativity is what I'm relying on.

Q. So just, you know, for the jury, what are you -- when you say the "global position," is that -- in layman's terms, does that mean, like, actually where the car was, or does it mean something different?

A. Yeah, on the Earth.

Q. Okay.

A. The global position of this vehicle on the Earth can only be guaranteed within this range. There are actually federal standards that require GPS systems to adhere to accuracies -- I believe that was established back under Clinton -- was that it required GPS systems of all kinds, any kinds -- whether it's an Apple Watch, iPhone or a SYNC module -- to adhere to these standard

accuracies.

And again, that's the global accuracy that anywhere on the planet, it needs to pinpoint you within that range. You do then need to consider open roadway, relative theory between points to help establish trends.

So yes, in general, GPS is difficult to help us establish lateral lane position, but we can rely on the trend of those points. And that's what I was trying to express in my report.

Q. Okay. So just to sort of sum that up, you're not saying that the GPS track points help you pinpoint precisely where Caylee's vehicle was at every second, right?

A. Right, I never did.

Q. Okay, perfect, right?

What about the bearing data? What is your understanding of the accuracy of the bearing data from the Gen 3 SYNC module?

A. I'd have to go back into the paper to see the global accuracy of the bearing data. But it falls back on -- I'm analyzing a trend. And so I don't have an answer teed up, because I didn't rely on it, because that wasn't part of my analysis.

What was part of my analysis was theory of relativity, analyzing the trend, the consistency in the

bearing data on the straight segment of road, the consistency of the bearing data in the actual curve of the road and measuring the curve of the road to see the accuracy of that bearing data.

So you can say I independently validated the bearing data on the approach around the curve and on the straightaway, and all of those points were consistent with the parallel orientation of the roadway itself. So the bearing data, again, I don't know, necessarily -- teed up off the top of my head -- the global accuracy. But when you analyze it on a case-by-case basis, you can determine the validity of the data for this particular case, which was very reliable.

Q. So just to break that down, you measured not using the bearing data, but using engineer magic, the curve of Interstate 45 on approach?

A. Yes. You can measure the curve.

Q. Okay. And so then you can figure out -- again, using engineering magic and your expertise -- what the bearing changes are of that curve?

A. Yes.

Q. And then you compared that, your analysis, against the bearing data from the Gen 3 module?

A. Exactly.

Q. And it validated, in your opinion, the

accuracy of the bearing data from the Gen 3 SYNC module?
A. You got it.
Q. Okay. All right. Perfect, perfect. Just want to make sure. Okay.
So have you -- you did collect the -- well, strike that.
You reviewed the collection of the air bag control module as well, right?
A. Of the Ford, right?
Q. Of the Ford, yes.
A. Yes, mm-hmm.
Q. Did you review the ACM download from the Toyota?
A. I did.
Q. Did either of those vehicles record an event on April 30, 2022?
A. Not on that particular date. The Toyota did have two events that were unrelated to the facts of this case, either some prior or subsequent event not consistent with the facts of this case.
Q. Okay.
A. The Ford had nothing on it.
Q. Okay. So what is your understanding of what it takes to trigger the ACM module in the Ford Explorer?
A. Typically, it's a 5 mile per hour change in

speed over a 150-millisecond time sample. However, every manufacturer -- that's the federal standard. But many manufacturers will go underneath that standard. So for instance, Toyotas can pick up changes in speed of less than a mile per hour. We'll see a lot of events on Toyotas. So all I can tell you is what the standard is. It's less than 5.

Q. Okay. So the lack of an event on the Ford Explorer ACM tells you that there was at least -- strike that.

The lack of an event on the Ford Explorer ACM tells you that there was no reduction of speed of 5 miles per hour or less within a 150-millisecond event?

A. Or more.

Q. Or more, okay.

But that's what you're able to derive from that?

A. Yes.

Q. Okay. So would you typically expect to see an ACM event in a pedestrian motor vehicle accident?

A. I have only seen an ACM event for a pedestrian impact, I think, twice in my career.

Q. Okay. Describe those situations, if you would.

A. One was actually the Mustang that we talked

about earlier going 100 miles per hour. Given the speed difference, that was a -- provided a significant enough change in speed of the Mustang. I don't remember the exact change in speed recorded by the Mustang, whether it was three or four or five or six. But it is rare to get pedestrian impacts recorded on the air bag control modules.

Q. Why is that?

A. The weight disparity between the vehicle and the pedestrian is such that the vehicle does not change as much speed as the pedestrian does, especially when you have offset collisions, like this particular one where it is just the mass of the pedestrian's head versus the vehicle versus the entire mass of the body versus the vehicle. So the likelihood of having that impact the momentum of the Ford is even less.

Q. Okay. Can -- in your experience, are ACM events normally triggered by hitting another object, braking, or a combination of the two? Or is braking too slow to trigger an ACM event?

A. Braking is typically too slow. Some of the newer manufacturers are now having event-based triggers like braking. And certainly, braking can be picked up on the sensors during a collision, but typically, they don't trigger an event.

Q. So on the Ford Explorer's ACM, did it pick up a braking event?

A. That generation does not pick up braking events. It doesn't trigger based on the braking events.

Q. Okay, okay. And you have reviewed the photos from the scene taken by the Texas Department of Safety Troopers, right?

A. Yes.

Q. Okay. And you've reviewed Caylee's cell phone records?

A. Yeah.

Q. When I say "records," I mean the download of her personal iPhone, right?

A. Mm-hmm, yes.

Q. You've not reviewed any other cell phone records of hers, have you?

A. There were some exhibits with screenshots of her texts. But the -- I think it's Cellebrite --

Q. Yes.

A. -- published the report for her cell phone records.

Q. But nothing, like, from a carrier, like, from AT&T or something directly like that, right?

A. No. I think it was all from Cellebrite.

Q. Okay, okay. What else did you review, if you

remember?

A. Regarding cell phone?

Q. Oh, sorry. Just evidence in this case, which, you know, strike that. That's too broad, and I guess it would be a wild goose chase.

You cited the Aperture report dated July 10, 2023. Do you recall reviewing that?

A. Was that the one that discussed the lack of data on the Ford?

Q. I'm not sure, right?

Do you know if you included that in the file that you've provided me?

A. If it was part of my file, it would be in the file that I provided you.

Q. So let's see. Would that be in the expert -- or excuse me, in the Materials Received folder?

A. Yes, somewhere in there.

Q. Okay. Can you tell me where in there?

A. Okay. So I think this is the report you're referring to from Aperture, July 10, 2023.

Q. But you tell me. Like, just tell me where it's at in this file that you provided me.

A. This is located with the Toyota download data. So it would be under Materials Received, Download Data, Toyota Camry, and there's a file titled Toyota

Report.

Q. Okay. Very good, very good. Thank you.

So would you agree that the quality of your accident reconstruction in this case would have been improved if you were able to get on scene to the crash as soon as possible after the crash occurred?

A. No, I disagree with that. The photogrammetry process provided me accuracies within a quarter of an inch, which is going to be within the general accuracies of drone mapping, laser scanning. You know, at the end of the day, the analysis I do typically has a range of even plus or minus a couple feet, because these distances aren't that sensitive. So we're actually using quite high tech equipment to measure things that we don't need that much accuracy on.

So no, I don't think the quality would have been better. I think the quality of my reconstruction is consistent with the quality that I would expect if I was out there myself.

Q. Okay. Do you ever get called personally to go to crash scenes?

A. I do.

Q. Recently?

A. Yes.

Q. Like, how -- how close in time do you

normally go to a crash scene?

A. So we call it quick response. We are typically called by the insurance company or the retaining counsel for the insurance company, sometimes quick enough to get to the scene while the vehicles are still on scene before they're towed. It varies; it comes in waves. I would say I get a handful of those a year.

Q. Okay. Do you think that's overkill when they do that, since you can do a lot of this with photographs?

A. It depends on who is documenting. If nobody takes pictures, then yes, it is helpful for me to be on the scene. If the police are doing a thorough documentation with photographs, it's obviously not necessary. As long as somebody documents photographically, that is sufficient.

Q. Okay. What sort of resolution on the photographs do you need to conduct accurate photogrammetry?

A. Well, again, it's going to base -- or I'm sorry. It's going to depend on the photographic quality itself. I don't have a standard that needs to be met for the photographs in their quality versus just generally documenting the evidence. And what I can do is then calculate the resolution or the accuracy of that data once I start performing that photogrammetry process.

So in this particular case, like I said, it was -- at worst, plus or minus a quarter of an inch was the worst accuracy I had on the worst point. Everything falls within that "plus or minus quarter of an inch" resolution based on the photos that I've been provided in this particular case.

Q. So we talked earlier about photogrammetry basically being this analysis of photos to figure out distances. And I think I understand your testimony earlier that you need -- you need something that you're sure about. You need a distance or -- that you -- in the photos that you are 100 percent or close enough sure about; is that right?

A. Yes. You need known 3-dimensional points.

Q. Okay. What were the known 3-dimensional points you used in your photogrammetry analysis in this case?

A. So CAC performed a drone mapping of the scene. I personally took those photographs and processed them in Pix4D to generate a scaled orthomosaic in 3-dimensional point cloud. It is the standard for collecting scene evidence with drones. That is how we document our scenes now is drones.

We use the series of photographs collected, and essentially stitches each pixel together from

subsequent photos and establishes 3-dimensional points of those photos. The same process of photogrammetry, but millions of times, using every pixel instead of chosen points.

So it's called photo scanning because it uses more than just points. Again, another heavily-validated, peer-reviewed, well-established methodology that we've been using for decades in the industry.

And so I use their drone photographs to create my own 3-dimensional diagram of the scene, and was able to use the roadway features that were permanent, like lane lines and roadway cracks and raised pavement markers, barrier wall cracks, anything that I could see between the two and correlate the 3D point for my model and establish that 3D point in the photograph.

Q. When was the drone mapping conducted at the scene?

A. I believe that was the six months after, and I independently validated that there were no changes to the roadway within those six months based on historical documentation and aerial imagery, flyover imagery, and Google Street View imagery.

Q. Now, so how -- do you have to put the photogrammetry of te Toyota that was taken, or those photos that were taken at the scene and at the tow yard,

wherever that was, and put them together with the scene map that you made of the crash scene to figure out where the Toyota was on the road?
A. Just to simplify it, no. It wasn't needing to put the Toyota together. It was a photogrammetry analysis of the scene that established the 3D points of the Toyota in the scene.
Q. Okay.
A. And then, obviously, I can place a 3D model on top of those points from a diagram.
Q. Yeah.
A. But the position of the Toyota was established from all of the photographs taken on scene.
Q. So specifically, what were the fixed points that you used to validate your 3D model?
A. That is going to be quite an extensive response. I'm happy to go through it. There are a lot of points. We can go through it one by one. After this question, can we take a lunch break though? Because this will be a long answer.
Q. Well, I guess, is the answer to that question recorded somewhere in your report that --
A. Yes --
Q. -- we can -- rather than have you give an --
A. -- there is.

Q. -- extensive answer.

So where is that in your report?

A. Page 69, Figure 99, through Page 76, Figure 113. And then in addition to that, I have the full PDF report outlining all of the 3-dimensional points, the X, Y, and Z coordinates, of all of those points that were used and are visible in these photographs.

Q. So I guess -- and just, you know, glancing through the figures that you just identified, I want to make sure: Are these figures identifying the fixed points that were then used to create the model, or are these figures identifying measurements based on the 3D model?

A. Both.

Q. Okay. So I guess my question is, Which of these fixed points were unchanged since the accident, the drone picked them up, and then they were used to generate the 3D model?

A. So starting with Figure 98, what I used was the road lines, the raised pavement markers; and in this particular case, this roadway was sectioned in squares, and so I was able to use the seams of the roadway, the intersections of those seams as known 3-dimensional points in addition to the rumble strips on the shoulder.

So I had a lot of really good reference points. Normally, we just have road lines like the skip lines and the raised pavement markers. This one, I had the road lines plus all of these cracks and seams in between, which was more than I usually have.

Q. So to measure all of this, is that what the drone did? It's, like, the drone measures the distance between road lines and rumble strips, and that's how you can then apply that to these photos and then create the 3D model?

A. Yeah. Essentially, the drone takes enough photos overhead to establish a 3D model of the scene where every pixel is now a 3-dimensional point. And so I then look at that 3-dimensional point of a crack from the drone scanning and import that into a photogrammetry software enough times on that photo where eventually the camera can be fixed in space, and then I can reverse engineer the unknowns from that photo.

Q. Okay, okay. What's the photogrammetry software that you use?

A. PhotoModeler.

Q. Okay. Is that the one you typically use?

A. That's -- there are a couple of others, but yeah, we have PhotoModeler, so that's what we extensively use.

Q. Okay. Is that widely used in your profession?

A. Probably the most popular, I would say.

Q. Okay. So would you agree that a scene is a little bit like a puzzle?

A. I would say that accident reconstruction is like a puzzle, yeah. We're putting puzzle pieces on a puzzle board, and you can say the scene is this puzzle board, and we try to put enough pieces on the puzzle board to try to paint a picture of what happened.

Q. Okay. So have you spoken to any of the individuals that inspected the Ford Explorer or the Toyota Camry?

A. No. I'm just relying on the photographs and documentation.

Q. Okay. Have you relied on any interviews with anyone that you or someone at Focus Forensics took to generate this report?

A. No.

Q. Okay. So let's go to Page 6 of your report. So on Page 6, you described the immediate approach to the crash, right? And you can use a paper copy if it's faster. Either way is fine.

A. What line are you on?

Q. So let's go down to the last paragraph on

Page 6.
A. Okay.
Q. Okay. So you say that -- well, I guess, can we agree that Caylee was northbound on Interstate 45 on April 30, 2022, right?
A. Yes.
Q. Okay. So you said that Northbound Interstate 45, in the area of the incident, was level and flat?
A. Yes.
Q. Okay. You said the northbound approach was straight for approximately 0.33 miles prior to the incident?
A. Yes.
Q. Okay. So tell us about the curve on Interstate 45 that Caylee went around before she impacted Nehemias.
A. Yeah. It curved to the left by about 13 degrees over the course of .17 miles, and then it is in a complete straightaway for that one-third of a mile, or about 1,500 feet.
Q. Okay. And you provide a little more accuracy later on in the report. It's about 1,742 feet that it's straight, right?
A. No. That's the unobstructed sight line to the northbound travel. It is perfectly straight for

1,500 feet, but as you round the end of the curve, you can start seeing the northbound lane.

Q. Okay, okay. Fair enough.

So your car can still be turning left, right, but you can -- as a driver, you can look about 1,700 feet forward?

A. Yes. The barrier wall was the physical obstruction that we're looking around.

Q. Okay. Got it.

So you say the speed limit was 75 miles for the area of the collision?

A. Yes.

Q. And how are you getting that?

A. A speed limit sign.

Q. Okay. So are you aware of any county rules where the incident occurred that would have lowered the speed limit?

A. Not that I've been provided.

Q. Okay. So you're just going off, what, the speed limit sign that you saw?

A. Yes.

Q. Okay. You agree it was clear and sunny on April 30, 2022?

A. Yes.

Q. How did you reach that conclusion?

A. The weather reports for the nearest airport provided sun and weather data. The body cam videos, the dashcam videos, and photographs provided environmental documentation shortly after the crash.

Q. And I saw you provided the azimuth of the sun. So can you agree that the sun was not in Caylee Smith's eyes as she was going straight on Interstate 45 towards Nehemias?

A. Correct. It was to the southwest, so it would be behind her and to the left.

Q. Okay. So would that mean that, if you're northbound on I-45 towards where the Toyota Camry was stationed, the sun was shining on it? It would -- you would not have been looking at the sun and the Toyota Camry?

A. From the pedestrian's perspective?

Q. Sorry, yeah. That's a bad question.

From the perspective of Caylee Smith approaching the Toyota Camry, she would have seen the Toyota Camry and not seen the sun at the same time?

A. Correct.

Q. Okay. Any reason to think the sun was not illuminating the Toyota Camry or any of the pedestrians around it?

A. No.

Q. Okay. So we agree that weather and glare were not contributing factors to this crash?

A. I agree.

Q. Okay. So 1,742 feet, that's the unobstructed sight line, right?

A. Yes.

Q. What is that, about a third of a mile, a little over?

A. It's over a third, because a third is 1,500 feet.

Q. Okay. So you testified, or you included in your report on Page 7, first paragraph, that from the beginning of the unobstructed sight line, if Caylee had been going the speed limit of 75 miles an hour, how long would it have taken her to get to the crash site?

A. 16 seconds, approximately.

Q. Okay. And I think your report tells us how long, as she comes into that uninhibited sight line, she would have had to get to the crash site if she was going 90 miles an hour?

A. Yes. 13 seconds, approximately.

Q. Okay. So the difference between going the speed limit and going 90 miles an hour as far as time to see the accident or to get to the scene is three seconds?

A. Over that distance, yes.

Q. Over that distance. Okay.
So can we agree that as Caylee Smith came around the curve, she had at least 13 seconds to spot Nehemias Santos and the Camry?
A. So I can't actually tell you what she saw or what she could see. All I can tell you is what was available based on an unpopulated environment. I don't know. Nobody knows what the traffic conditions were. So I don't know how close she was behind a vehicle in front of her; I don't know the status of that vehicle, whether it was a car, a truck, a box truck, a tractor-trailer. All I can say is an unpopulated value would give these values. I can't say what she actually was provided, because I can't replicate the traffic.
Q. Okay. Fair enough. Right.
Do you have any evidence that indicates to you what the traffic was like? Was it heavy, medium, light?
A. I try to avoid subjective terms like that. I know, certainly, the testimony has varying levels of opinion of what the traffic was like. Everyone's opinion is going to be different on what "heavy" is and what "light" is. All I can reference is the photographs, the body cam videos to give a good idea of the backup of traffic. There was traffic, and that's -- I'm going to

stay objective on that. I can't really quantify the traffic.

Q. Okay. Are there any objective measurements of traffic flow that you're aware of?

A. Annual values, yes, average annual values, but not a specific time frame that we are looking at.

Q. So are there any -- in your line of work, are there any descriptions about, like, how many cars are traveling past a certain point in a certain amount of time, like, in an hour or a minute? Are those figures that are normal in your profession?

A. Yes. Like I said, the average annual traffic counts. Those are basically just an overall average, an annual average of traffic in that area.

Q. Are there any metrics that are more pointed in time, like in an hour or in a day or anything like that?

A. Not unless there's, like, a specific traffic study that was requested. I'm not aware of any specific level of data that gives you that level of precision.

Q. Okay. Fair enough.

A. Can we -- can we stop for lunch?

MR. WHITE: Sounds good to me.

MR. DUBOFF: Yeah.

THE VIDEOGRAPHER: The time is 12:18 p.m. We

are off record.

(Break was taken from 12:18 p.m. to 12:58 p.m.)

THE VIDEOGRAPHER: The time is 12:58 p.m. We are on record.

BY MR. WHITE:

Q. Okay. This is Jacob White. We just took a little lunch break. So we're coming back on the record.

I think we were talking about the line of sight that Caylee had as she was approaching the Toyota Camry. Sound right to you?

A. Yes.

Q. Okay. Now, you are not offering an opinion about whether Caylee should have seen Nehemias or the Camry as she came around the curve, right?

A. I don't think I can as worded. I don't know if she could. What I can say is what fixed environmental objects there were that would have prevented her and the timing of that obstruction. But I can't say anything other than that, because I don't know what traffic was like.

Q. Okay. So just to put a point on it, as -- as she came around the curve at a point 1,742 feet south on the road, that's when -- assuming no other obstacles, all the fixed obstacles had been removed between her and the

Toyota Camry?
A. You got it.
Q. Okay, perfect.
Now, are you aware of any evidence -- I think you already answered this, but just let me get this straight. Are you aware of any evidence that Caylee could not have seen the Toyota Camry as she came around the curve other than the fixed median barrier?
A. And other than potential traffic, I'm not aware of anything else.
Q. Okay. But you don't know about the traffic. Like you said, like, that's just an unknown for you?
A. Correct.
Q. It's possible that there was traffic between her and the Toyota Camry; you do not know?
A. Correct.
Q. Okay. So you can agree that Caylee had the capacity to see the Toyota Camry, 1,700 feet -- for 1,742 feet away from the Toyota Camry?
A. It's possible.
Q. Well, it's possible that -- I'm asking, Did she have the capacity, not whether or not she did.
A. To me, "capacity" means that there was no traffic, so I can't answer that.
Q. Okay. So, well, assuming there was no

traffic, right -- which maybe, maybe not. If there was no traffic, she would have seen the Toyota Camry 1,400 -- 1,742 feet down the road?

A. I agree. If there's no traffic, it was there to be seen, albeit rather small in your field of view, because 1,700 feet is very far away. But yes.

Q. Okay, okay. So do you agree that the Toyota Camry was conspicuous to oncoming drivers?

A. Depending on traffic.

Q. Okay. So if there was no traffic, was the Toyota Camry conspicuous to oncoming -- or to Caylee Smith?

A. Yes.

Q. Okay. Why do you say that it was conspicuous?

A. Because it was there to be seen.

Q. Okay. So is there any factors about the Toyota Camry that made it more conspicuous than any other objects on the road?

A. I don't know if I understand that question.

Q. Okay. So you said that it was conspicuous because it was there to be seen, right?

A. Right.

Q. So did you study the conspicuity of the Toyota Camry?

A. Conspicuity is really only a factor for nighttime detection. That's not really a variable we analyze in the daytime analysis.
Q. Okay. So how do you analyze in a daytime analysis whether or not an object in the roadway is easily seen by oncoming traffic or hard to see?
A. It depends on the factors of the case. So visibility is not the critical variable that we're analyzing here. It is identification of an imminent hazard. So visibility has no bearing on the analysis of avoidability. It's when did the hazard become imminent?
Q. Okay. And your testimony, I believe, earlier was that it's your expert opinion that the Toyota Camry by itself was never an imminent hazard, right?
A. Correct. It was a potential hazard, is what the literature references it as, which does require some form of input but not an emergency input.
Q. So where in your report did you differentiate between potential hazards and imminent hazards?
A. Well, these aren't necessarily things I was planning on bringing forth, but you've certainly been asking a lot of questions about it, which I have the expertise to answer. So I've been answering your questions.
Q. Sure, sure. Would you -- if you had the

opportunity, would you like to amend your report to include those conclusions?

A. I guess it depends on the issues at hand. If the opposing expert is going to opine differently than that, then yes, I will need to amend my report to rebut his or her opinions. At this point, I didn't know if this was going to even be an issue or not.

Q. Okay. So do you agree, based on your view of the evidence, that the Toyota Camry was black?

A. Yes.

Q. Okay. And the roadway was, I'm going to say, light-colored?

A. Sure.

Q. Is that fair?

A. Sure.

Q. Okay. The median was light-colored?

A. Yeah.

Q. Okay. The median barrier was light-colored?

A. Right.

Q. And then on the right-hand side of the road was a grassy ditch, right?

A. Right.

Q. Not dark-colored, right?

A. Right.

Q. Okay. So can we agree that, on approach from

Caylee Smith's perspective, the trunk of the Toyota Camry was open?

A. It was.

Q. Okay. And now, I think we all agree that it was, but, like, technically, we don't know, right?

A. I believe there was body fluid inside the trunk lid --

Q. Okay.

A. -- which would indicate it was open at the time.

Q. Fair enough, fair enough.

Do you know if the emergency flashers were on?

A. I know they were on in the body camera videos, so I think it's safe to say that they were on at the time of the impact.

Q. Okay. Do you know how many pedestrians were around the Toyota Camry as Caylee Smith approached?

A. It's either two to five depending on who you believe.

Q. Okay. So if it was just two, it was Nehemias Santos and Evelyn Moreno, right?

A. Yes.

Q. And if you believe Evelyn Moreno and Erick Santos, it was all five of the passengers in the

car?
A. Correct.
Q. Okay. So do you agree that a reasonably prudent driver would have vacated the leftmost lane or slowed down after they saw the Toyota Camry?
A. Not based on the literature. In part, I do want to say a reasonable driver does slow down. We know that Caylee slowed down. She slowed down and moved over to her right. That is what the literature shows the average driver does.
Q. So does the literature tell us when someone would slow down and move to the right if they saw a hazard in their lane?
A. They indicate 1 to 3 miles per hour of speed loss from a reduction of accelerator pedal application, which, on a timeline, is actually after Caylee started reducing her speed. So Caylee started reducing her speed first, before, or quicker than the average.
Q. So does the -- does the literature indicate how far away from the hazard or how soon after the hazard gets identified that someone would reduce their speed and move to the right?
A. I'd have to double-check that in the form of distance. But again, we can figure that out from speed loss and the magnitude of the speed loss.

Q. Okay. So do you have an opinion of, as far as the literature goes, when most drivers, how far away they are from a hazard when they, you know, get over to the right and start slowing down?

A. Well, it's going to depend on their original speed. So I don't think there's a standard I can answer that with, because it's going to be based on the original speed of travel. What I can say on a time and speed standpoint, 1 to 3 miles an hour has been the speed reduction; Caylee reduced her speed by at least four. So she started reducing her speed sooner, and she reduced her speed more than the average driver.

Q. So you say, "She started reducing her speed sooner." What do you mean by that?

A. Well, she indicated that she just let go of the gas, and that is the typical response that we see in the literature is releasing the gas. So the deceleration rate's going to be very similar, which is releasing the gas pedal with no brake application.

Q. Can you tell from the infotainment module whether she took her foot off the gas before she hit Nehemias or as she's in the process of hitting Nehemias?

A. 100 percent before.

Q. Okay. How far before?

A. Let me get that distance for you.

Approximately 250 feet away.

Q. Okay. So what -- what data are you looking at to conclude that she was 250 feet away from hitting Nehemias Santos when she began to slow down?

A. This is looking at the track point data, which gives us data every one second. And in my engineering calculations, I calculate the distance traveled between those points based on the speed values reported.

Q. So looking at the track log, at what second -- now, you say this in your report, so this isn't a trick question. But at what second do you believe the collision occurred?

A. The time stamp that I have here is sometime between 2:48:51 and 2:48:52.

Q. Okay. So when you're calculating the reduction in speed, are you looking at her speed -- well, tell me at what point you see her speed begin to decrease on the track log seconds.

A. 250 feet away.

Q. Okay. What second is that in the track log?

A. 2:48:50.

Q. Okay. So at -- you're saying at 2:48:50 is when she begins to start slowing down?

A. Yes.

Q. What is her speed at 2:48:50?
A. 90 miles per hour.
Q. Okay. And that's kind of a rounding, right? Or is it precisely 90 miles an hour?
A. It's pretty spot-on to 90, yes.
Q. Okay. All right, yeah, it's 89.97.
So again, the next second, what is her speed, 2:48:51?
A. 87.
Q. Okay, 87.
And so, then, what is her speed at the next second, 2:48:52?
A. 82.
Q. Well --
A. 83.
Q. 83, okay.
So between 2:51 and 2:52 -- strike that.
Between 2:48:51 and 2:48:52, do we know which of those seconds the collision occurred at? Or I know your report says it's one of those two or between.
A. Somewhere between.
Q. Okay. So you say that her speed began to reduce two seconds before she collided with Nehemias Santos, right?
A. One and a half, yeah, about one and a half.

It could be up to two.

Q. Okay. So one and a half to two seconds before she collides is when she begins reducing her speed?

A. Right.

Q. Okay. Can you tell from the evidence that you've got if the speed reduction is the result of taking a foot off the gas or tapping the brake?

A. Well, the subtleties between when you say "tapping," it's consistent with a speed loss of letting go of the gas. Now, if she touched the brake, could be consistent with that too.

Q. Okay.

A. But it's not consistent with hard brake application.

Q. Okay. And you've reviewed the police report, right?

A. Yes.

Q. And you agree that the police report says there are no brake marks created by the Ford Explorer?

A. I think that's what it says, yes.

Q. Okay. Did you see any brake marks created by the Ford Explorer?

A. No.

Q. Okay. So to the best of your knowledge,

right, there's no affirmative evidence that Caylee applied the brakes in the two to three seconds before she hit Nehemias Santos, right?

A. Well, you don't necessarily have to have tire marks to apply the brakes, especially with modern ABS. We actually rarely see tire marks.

Q. Well, I'm not asking if it's possible she applied the brakes. I'm asking, Do you see any evidence that affirmatively shows that she applied the brakes in the two to three seconds before collision?

A. Not one way or the other. She certainly could have; she may not have.

Q. You just can't tell?

A. No. But it is consistent with a speed loss rather greater than the average speed loss of the average driver faced with this situation.

Q. Okay. So you think that she maybe did hit her brakes?

A. No, I never said that. I said she reduced her speed greater than the average driver does in this particular situation.

Q. So just to put a pin on it, you're saying that the speed change from 90 miles an hour to somewhere between 87 and 86 miles an hour, two seconds to one and a half seconds before hitting a pedestrian, that's normal

for a reasonable driver?

MR. DUBOFF: Objection to the form.

A. The speed loss is what the typical driver does to a roadside vehicle and pedestrian.

Q. Okay. When you say "a roadside pedestrian and vehicle," are you talking about a vehicle stopped in the lane?

A. I am.

Q. Okay. Have you reviewed literature that discusses driver reactions to vehicles stopped within the lane?

A. It's typically either entirely within the lane or entirely out of the lane. I'm not aware of any studies that show 2 feet into the lane. So the best I can do is look at this as a vehicle parked on the shoulder and look at what drivers typically respond to to a vehicle parked on the shoulder. Since this was mostly on the shoulder, it's the closest we have to compare to.

Q. So you didn't compare this situation to the literature examining motor vehicle drivers reacting to a vehicle parked entirely in the lane?

A. No. This is not anywhere near that type of scenario. That is a totally different visual stimulus, totally different set of equations that factor in the capability of drivers to appreciate relative closing

speed. The presence of the vehicle mostly on the shoulder gives the cue that this vehicle is slow or stopped, particularly with the pedestrians standing outside the vehicle and the trunk lid open. If the vehicle was entirely in the lane, that would be a whole different ball game on a driver's ability to appreciate that it's traveling slow versus at normal highway speeds.

Q. Okay. So how do drivers react when they see a vehicle stopped entirely in the lane?

A. So just to be clear, that's not what we have.

Q. That's fine, that's fine.

A. But based on that, drivers' abilities to avoid a vehicle on a highway -- a straight, flat level segment of highway -- stopped in their travel lane is virtually impossible to avoid. The rate of closure, anything greater than 45, 50 miles per hour of a closing speed becomes rather difficult, if not impossible, to avoid.

Because by the time the human eye can appreciate the relative closing speed between them and the vehicle ahead of them, it's too late to fix that relative speed in the form of braking or steering. So a closing speed of 90 or even 70 or 75 would be unavoidable entirely if the Toyota was stopped in the travel lane.

Q. Okay. So I mean, facts matter, right? I

mean, there could be things going on around the car; say it was a police car or an emergency vehicle with its lights on, right?

A. Well, now you're talking a completely different visual stimulus, yes.

Q. Sure, sure. So it depends on what's happening at the scene to determine the visual stimulus that oncoming drivers are reacting to?

A. Right, and that's why I didn't model this as a stock vehicle in the travel lane, because that's not the visual stimulus we have here.

Q. Okay. So why is it just one option? Like, why model it as a car parked entirely on the shoulder or a car parked entirely in the lane? Like, why not model it as a car parked 2 feet into the lane and however many feet on the shoulder?

A. As far as I'm aware of, there are no human factor studies that divide the two. It's studies that show what drivers do when a vehicle is parked on the shoulder and studies that show what drivers do when a vehicle is stopped in an active travel lane. In this particular case, there was enough context to visually indicate that this vehicle was stopped on the shoulder. There was no question about that.

Q. Okay.

A. So the modeling of this visual stimulus as a vehicle parked on the shoulder is entirely consistent with that literature. There is no question of "valid."

Q. So in your view, the literature leads you to believe that an oncoming driver would have seen the Toyota and understood that it was stopped?

A. Yes.

Q. Okay. There wouldn't have been this phenomenon of, "Is it stopped or isn't it?" in closing too fast?

A. No.

Q. Okay. So can you agree that if a driver saw a vehicle partially in the lane of travel on an interstate highway that a reasonable driver would pay attention to that vehicle and evaluate its risk?

A. I can't talk about what a reasonable driver would do. Again, all I can tell you is what the studies show the average driver does and let the jury decide what's reasonable. And what I can tell you is the studies show that the average driver simply shifts over in their lane.

Q. Okay. And they do that why, according to the studies?

A. I don't know if the studies particularly say why. But obviously, I think the assumption is to provide

additional space.

Q. Okay. So did you -- I think we talked about this earlier. Did you calculate whether Caylee had sufficient time to brake to avoid the Toyota Camry?

A. So that is a calculation we can't do, because we don't know when the stimulus started as far as the pedestrian bending over into her travel lane. She had already responded to the car.

Q. So let me just ask a very specific question: You believe she did have time to brake to avoid hitting the Toyota, right?

MR. DUBOFF: Objection to the form.

A. I don't agree that braking would be a good avoidance option, because now you're creating hazards for traffic behind you. The Solomon curves indicate that if you go slow on a highway, your crash risk exponentially increases. So you certainly want to reserve braking for absolutely necessary circumstances.

Q. Fair enough.

A. So that is not a good avoidance option.

Q. Fair enough.

I'm asking, Was it an avoidance option that she could have utilized, given the amount of time that she had approaching the Toyota Camry?

MR. DUBOFF: Objection to the form.

A. It is not an appropriate response. It would have likely resulted in possibly some other conflicts. And the average driver would not apply the brakes to something that is not an imminent hazard. Again, we don't lock up our brakes and then say, "Oops, I guess I didn't need to lock up my brakes." We reserve it for absolutely necessary hazards. Locking up the brakes for a car 2 feet into your travel lane is not a viable option.

MR. WHITE: So I'm going to object to the nonresponsive form of the answer.

Q. My question is whether or not she had time to apply the brakes as she approached the Toyota Camry.

MR. DUBOFF: Objection to the form.

A. So the Toyota Camry was never an imminent hazard; it was a potential hazard. So that calculation cannot be done, because perception response times and braking distances apply to imminent hazards. So you're asking me to completely disregard the instructions of human factors, which is only applied in the literature to imminent hazards. I would be violating the first rule of human factors analyses in applying an imminent emergency response to a potential hazard. That is not appropriate.

Q. So you won't tell me whether or not she had time to apply the brakes as she approached the Toyota

Camry?

MR. DUBOFF: Objection to the form.

A. What I'm telling you is nothing indicated to her that she needed to slam on the brakes.

Q. I didn't ask about slamming on the brakes. I asked, Are you refusing to tell me whether or not she could have applied her brakes as she approached the Toyota Camry?

A. Well, everybody is capable of applying brakes. But the question is, Was there any visual stimulus that would require a driver to do so? So the question you're asking is irrelevant of the facts of the case. Can you apply brakes? Yeah, you can apply brakes anytime you want.

Q. Could she have -- did she have time to apply her brakes to reduce her speed as she approached the Toyota Camry?

A. Again, the time has to be relative to the imminent hazard. You're asking me to measure something that doesn't exist.

Q. Okay. I'm asking you, After she saw the Toyota Camry, did she have time to apply the brakes to reduce her speed?

A. I don't know when she saw the Camry.

Q. Okay. You saw that she -- you've read her

deposition, right?
A. Yes.
Q. What do you understand her testimony is about when she saw the Toyota Camry?
A. I don't know.
Q. So you don't remember?
A. She can't give a distance, and that's what I would need is a distance.
Q. So tell me if what I'm about to tell you is inconsistent with what you understand. You agree that she testified that she sent a text message to Gracie saying the tattoo shop didn't do walk-ins?
A. Yes.
Q. And your opinion is she sent that text message eight to nine seconds before the collision occurred?
A. Yes.
Q. And you agree that her testimony is that she then looked up, saw the Toyota Camry in the road?
A. Yes.
Q. Okay. And as a result, her testimony is that she adjusted rightward while remaining in the leftmost lane?
A. Right. She responded to the Toyota.
Q. Okay. So my question is, when -- sorry. You

understand that her testimony is, then, that she looked at her GPS as she was approaching the Camry?

A. Yes. She understood that her corrective action was complete; there was no more risk or no more -- I don't want to say "risk." There was no more required response, because she implemented her response to the potential hazard. She looked at her GPS, then another hazard unfolded in front of her.

Q. So in the eight to nine seconds after she sent the text message to Gracie, was that enough time for Caylee to apply her brakes?

MR. DUBOFF: Objection to the form.

A. Again, you can certainly apply your brakes anytime you want. The question is, What is going to tell you to do so? And the average driver would not be provoked to apply the brakes at that point, again, because the literature says drivers don't respond until the threat is imminent and certain.

And applying the brakes at that point would increase the risk of additional conflicts, because now you're creating a speed differential on a highway, the exact same thing the Toyota created, was this drastic speed difference between travel speed, traffic, and their parked position on the shoulder.

Q. Do you know the relative speed of Caylee and

any other vehicles that were traveling on the roadway that day, other than the Toyota Camry?

A. The testimony said just typical speed of travel.

Q. Okay. What was the speed limit?

A. 75.

Q. Okay. And Caylee was going how fast on approach?

A. 90.

Q. Okay. So do you know what an advanced warning area is?

A. You need to be more specific. That's a pretty broad term.

Q. Do you know how the Federal Department of Transportation defines an advanced warning area?

A. Are we talking maintenance of traffic signage?

Q. Yes.

A. As far as construction zones?

Q. Construction zones or any lane closure.

A. Yes.

Q. Okay. What is an advanced warning area?

A. It's signage that indicates that there is some -- something ahead that's going to either require additional attention or your response in the form of a

lane change or speed reduction if there's a speed reduction sign.

Q. So I know we talked earlier about how traffic maintenance kind of starts going out of your area of expertise, correct?

A. Correct.

Q. But do you know what the Department of Transportation recommends as the minimum distance at which a driver should be warned of an upcoming hazard on an interstate highway?

A. I know I have read it, but that involves significant safety factors. And as far as work zones go, that has no relevancy to this case, so I haven't made that comparison because it has nothing to do with this case.

Q. Well, undoubtedly, there's a bunch of detail, you know, on additional warnings. But do you know the minimum warning that the Department of Transportation says must be given to a driver if there's a hazard on the road ahead?

A. Define "hazard."

Q. Some sort of obstruction like a lane closure or repairs being made.

A. Yeah, that is a whole different ball game. I don't know the definite number.

Q. Okay. If it's -- if I told you it's at least 1,000 feet, does that sound wrong to you?

A. No. I know it's in the order of fractions of a mile, maybe, if not more, up to a mile. But again, we're talking apples and oranges here. This has no bearing on this particular case.

Q. So do you think 1,000 feet is sufficient for a driver to become aware of an upcoming lane closure?

A. If you provide enough clear information, yes. The signs are designed to be very clear in their instruction of what is occurring or what to do, typically in the form of arrow boards telling you to get over.

Q. So 1,000 feet of warning can be sufficient to warn a driver of an upcoming hazard, right?

A. If you give them enough information. Looking at a Toyota obstructing 2 feet of a travel lane 1,000 feet away is going to be so small in your field of view that you're not going to appreciate how much of that travel lane, if at all, they're obstructing.

Arrow boards are designed where you pass arrow boards thousands of feet before the lane closure, so you're physically passing the information. The information is bright, it is big, and it is clear. It is giving you an arrow telling you which direction to go and which direction to change. Signage tells you things.

The small field of view of a vehicle parked on a shoulder with maybe a little bit into the travel lane is not clear at 1,000 feet away.

Q. Okay. So now, are pedestrians clear at 1,000 feet away on an interstate highway?

A. No.

Q. You can't see pedestrians at 1,000 feet away?

A. They're very small in the field of view.

Q. Are emergency lights visible at 1,000 feet away on an interstate highway?

A. Yes, lights are designed to be visible from great distances away. They're big, and they typically convey a message, an understandable message.

Q. Well, what is the understandable message conveyed by an emergency light on a normal passenger car?

A. Oh, you're talking about the four-way hazards?

Q. Well, yeah, I'm not an expert. I mean the lights that come on when you press the red triangle on your dashboard.

A. It can mean many different things. A lot of drivers accidentally leave those hazard lights on while they drive. But I think in general, the general understanding is that the vehicle is stopped or disabled.

Q. Okay. Well, would you agree or disagree with

me when I say that they're designed to convey that there's an emergency?
A. No.
Q. Okay. You agree that emergency lights convey, "Hey, there's an emergency"?
A. What kind of emergency lights?
Q. A passenger -- a car --
A. No, I don't think --
Q. -- emergency lights.
A. -- they respond -- I don't think they're saying "emergency." They're hazard lights; they're indicating a potential hazard.
Q. Okay. Now, like you said, you've reviewed the infotainment module and cell phone records, correct?
A. Yes, mm-mm.
Q. So -- and you concluded that Caylee sent her last text message to Gracie eight to nine seconds prior to the collision, right, on Page 13 of your report?
A. Yes.
Q. So you also concluded that at that time she sent that text message, how far away was she from impact?
A. Over 1,000 feet.
Q. You say specifically here, and can you just say it for the record? It's on Page 13 of your report.
A. 1,022 to 1,146 feet away.

Q. And that depends on whether or not she sent the text message at eight seconds or nine seconds before --
A. Exactly.
Q. -- right?
And we just don't know, right?
A. Somewhere in that range.
Q. Somewhere in that range, right.
So -- and I take it you're getting -- you did what I did, which is you lined up the time stamps on her text messages with the time stamps on the track log, right?
A. Correct.
Q. And the hours are different, right?
A. There is a difference on when it's reporting Central Daylight Time versus Central Standard Time, so there's a factor of daylight savings time.
Q. Okay. But you concluded that the hour differential was -- is irrelevant; that, in fact, those time stamps should line up?
A. Well, they do. It's clearly indicating Central Daylight versus Central Standard. Those are always an hour apart.
Q. Okay.
A. So it's just they report it in different

units, essentially.
Q. Okay. So you don't have a problem with lining up the track logs from the infotainment center with the time stamps from the cell phone records?
A. Correct.
Q. Okay. So if she had 1,742 feet of unobstructed sight line, how many of those feet did she go before she sent the text message?
A. It would be 1,700 minus the 1,022 to 1,146.
Q. So rather than us whip out our calculators, say it's approximately 700 feet?
A. Yeah, sure.
Q. Okay. So just to get a clear record, the difference between when she had an uninhibited sight line to the Toyota Camry and when she sent the text message, she had driven about 700 feet?
A. True. But again, the relative size of the Camry at 700 -- 1,700 feet away is rather small.
Q. Okay. But you agree with that math calculation that she used up about 700 feet of her uninhibited sight line before she sent the text message?
A. In the most simplest terms, yes, if you want to take out the factor of visual size of the hazard. It's much more complex than just a simple subtraction calculation like we just did.

Q. Are you aware that Caylee Smith says, sometimes, that Nehemias Santos suddenly appeared in front of her vehicle?

A. I know she used a couple different ways of expressing that he suddenly breached her travel.

Q. Okay. Do you agree that, to a distracted driver, an obstacle that has been in the roadway for a -- for a long period of time may seem to have suddenly appeared once the driver notices the obstacle?

A. Not in this case. So Mr. Nehemias was within the envelope of the Toyota for the time leading up to impact. Caylee had responded to that already. He then became a secondary hazard by breaching her travel path and sticking his head outside of the envelope of the Toyota.

Q. Okay.

A. So the timing of that is well within the eight seconds, so your question has no application to this case.

Q. So I just want an answer to my question. My question is, Do you agree that, to a distracted driver, an obstacle that's been in the roadway may seem to have suddenly appeared when the driver finally notices the obstacle?

A. I can only answer to the facts of this case,

and that question does not apply to the facts of this case, so I can't answer that generally. I'm here to apply the science to this particular case, and that doesn't apply.

Q. So you're not an expert on distracted driving?

A. What I'm saying is the way you worded that question doesn't apply to the facts of this case, so answering that question would be providing something outside of the facts of this case.

Q. Okay. So you could answer that question, you just don't think that's what happened in this case?

A. It's not relevant to the facts of this case.

Q. Okay. So -- and we'll get into why you think you know what happened.

But I'm asking, Do you think that a distracted driver could think that an obstacle suddenly appeared, even though the obstacle had been in their lane of traffic?

MR. DUBOFF: Objection to the form; calls for speculation.

A. The best answer I can give you is, It depends. I can't give you a blanket answer like that because it doesn't apply to every scenario. I have to -- I have to analyze each individual scenario individually,

and that doesn't apply to every scenario. So my answer is, It depends. It's not a yes-or-no answer.

Q. Okay. So it's possible that someone that's distracted could think than an obstacle suddenly appeared, even though it hadn't?

A. It depends.

Q. So is that a yes, it's possible?

A. Sure, it's possible, based on the facts of the case, sure.

Q. Okay. Is there any electronic data that you've reviewed other than Caylee's testimony that proves what she was doing in the driver's seat of the Ford Explorer after she sent the text message to Gracie?

A. I think I understand your question, which is, Is there any physical or digital evidence that tells us what she did after? Well, we know she swerved, based on the physical evidence, so we know she responded. So yeah, my answer is yes, the physical evidence indicates that she responded in that time.

Q. Okay. So other than her speed and her swerving, right, do we know what else she was doing in the cab of the Ford Explorer after she sent the text message?

A. Other than responding to the hazard.

Q. Okay. So do you have -- do you see any

physical evidence or electronic data that indicates that she checked her GPS after she sent the text message?

A. No. I don't think there's electronic data to tell us where her eyes were looking.

Q. Okay. Is there any electronic data or physical evidence you've reviewed that tells us whether or not she was looking at her phone or dictating or writing a text message after she sent a text message to Gracie?

A. No. What I can say is she did respond in those eight seconds. So at some point, she did identify the hazard.

Q. Okay. All right. I just -- you know, I just want to make sure I got the universe of your opinions right, that you're not going to go to trial and say, "Hey, I know she was actually, you know, looking at her GPS as she approached the -- or after she sent the text message." You don't know that, right?

A. She says she did.

Q. She says she did.

But other than that, is there any other corroborating evidence that you've reviewed?

A. No.

Q. Okay. So is there -- all right. Let's go to Page 4. So on Page 4, your second opinion is that,

quote, While a flat tire reduces the handling characteristics of a vehicle, it does not eliminate the ability to steer the vehicle off the roadway, as evidenced by Ms. Evelyn Moreno's ability to come to a controlled final rest on the left side of the roadway. Steering to the right was equally possible."

I got that right?

A. Yes, sir.

Q. Very good.

So did you see the groove created in the asphalt, presumably by the rim of the Toyota touching the asphalt?

A. Yeah. I really saw it more as a flat tire mark. When a tire goes flat, the center of the tire folds in, creating two outboard contact points of the rubber, and which rubs and leaves that black outboard marking on each side of the tire.

That tire mark, at least from where the officers photographed it, started about centered, just to the left of center of the left travel lane, which means that at that point, which may or may not be the beginning of the flat tire, the Toyota was hugging the right side of the lane.

Q. Okay. So but you don't know if that's because previously she'd been in the middle lane and she

was going into the left lane --
A. Exactly.
Q. -- or -- so you don't know, correct?
A. I don't know. But if she was in the left lane, she was hugging the right side of the lane when the flat tire happened. Or if you believe the other testimony that she indeed was in the middle lane and that is just simply her changing lanes to the shoulder.
Q. Okay. So -- but it's just hard to tell from that groove or that tire mark, right?
A. I can't tell definitively. But what I can tell the jury is that at the start of that tire mark that was photographed, she is on the right side of her lane. So I'll let the jury decide what they want to take of that, whether that is just simply her driving on the right side of the left lane when the flat happens, or if she actually did indeed make a lane change from the center lane to the left lane to the left median.
Q. Okay. Do you have any idea whether or not the tire mark was created the moment that the flat occurred, or is it possible that the flat began earlier and then progressed to a point where it began leaving the mark?
A. I would say it's probably more likely that it progressed -- or it started earlier than what was

photographed.

Q. Why do you say that?

A. Well, the cops didn't necessarily show the start of the tire mark very well. I still think there's a little bit more tire mark to be seen. So it's sometimes very hard to identify. And I'm not blaming them; it's sometimes hard to identify the beginning of a tire mark. And so I don't know if it would be instantaneous. I think it would likely take some time to generate the heat from the rubber rubbing incorrectly against the asphalt to start leaving that mark.

Q. Okay. So do you -- so what you've described, that the rubber deforms around the rim as -- you know, as a flat tire progresses; is that right?

A. Yeah. The rubber is fixed at each outboard side by the rim, by the rim flange. So when you get rid of the pressure, there's nothing supporting the center of the tire, so that's what folds first. And then the outside rim flanges keep the rubber rigid more.

Q. What happens as that pressure deflates and the rim begins touching the rubber?

A. The rim will either roll on the rubber and start eating into the rubber, or the rubber can fold out underneath one of the rim flanges, and the rim can start digging into the asphalt.

Q. Could you tell from what you reviewed here whether or not the rim ate into the rubber but the rubber -- but didn't puncture it, or if it did puncture it and began touching the asphalt?

A. I don't know if I would agree that it punctured it. Sometimes it rolls or folds out underneath the rim flange. I'd have to go back and look at the pictures to answer that question.

Q. Okay, okay. So what -- what is your expertise of how a vehicle handles when a flat tire occurs?

A. Depending on the type of failure will define the magnitude of the dynamics. Generally, it's going to create resistance, and it's going to pull, so the left side tire will pull to the left a little bit. The magnitude of that pull will depend on the type of failure.

A tread separation will give the greatest resistance. That is when the tread of the tire separates from the carcass of the tire and it's flapping in the wheel well, creating the most resistance. A flat tire is just simply creating resistance because of some increased friction. So that would be least resistive type of failure.

Q. Do you know what kind of failure happened

here?

A. This appeared to be a blowout. It looked like the side wall ruptured.

So I guess you can classify a tire failure into three failures. One would be a very slow air leak. We all get that when we get a nail in our tire and we maybe hear a hissing noise, but we still have some time to get to a shop.

Then there's a sudden failure, which is either the side wall or the tread ruptures, either from inconsistent wear or just failure within the structural integrity of the tire. That is a sudden loss of air, but you still have the tire underneath.

And then you get the tread separation where the tread separates from the carcass, the air escapes from the separation, and then the carcass is flapping in the wheel well.

Q. Okay. So you would -- would you agree that the Toyota, after the blowout here, would have been pulling to the left?

A. Slightly.

Q. Okay. So you can't tell from the groove or the tire mark where the blowout happened though, can you?

A. No. What I can say is what was documented. She was on the right half of the left lane.

Q. Okay. At some point?
A. At some point during or after the tire failure.
Q. Okay.
A. Which again, if we extrapolate that -- I'll let the jury do that extrapolation.
Is she simply riding the right side of the left lane the entire time, or did she indeed come from the center lane.
Q. Or it's possible she was centered in the left lane, tries to go to the right, and then decides to pull over to the left?
A. I suppose that's a possibility.
Q. Okay. Would you agree that if the Toyota had been in the leftmost lane after -- when the blowout occurred, Evelyn would have had to cross two lanes of traffic to get to the right shoulder?
A. Yes.
Q. Okay. So your opinion here is that steering to the right was equally possible. All right.
What engineering methods did you use to reach that conclusion?
A. So that is a vehicle dynamics opinion. It's not alluding to traffic. It is simply vehicle dynamic driver input handling. With a slight pull to your left,

you can still steer to the right.
Q. So when -- you say it was possible, right, for her to get over to the right?
A. Mm-hmm.
Q. Okay. But you'd say it's equally possible for her to get over to the right as opposed to the left shoulder?
A. Yeah. Maybe the word "equally" is misleading in regards to the amount of steering input. I'm certainly not alluding to that amount of steering input; I just mean that both are possibilities that you could do.
Q. So, you know, I'm not going to ask you to amend the report here. You agree that it would take more steering input to turn the Toyota to the right after the blowout than to turn it to the left?
A. A little bit.
Q. How much is "a little"?
A. I can't quantify that. Just qualitatively, it would be a little bit more.
Q. Okay. So did you conduct a mechanical inspection of the Toyota Camry?
A. There was an inspection done of the Toyota, but it had been repaired at that point, so I'm relying on the photographs of the Camry on the side of the road.

Q. Okay. Have you conducted any experiments to determine how a vehicle steers after a blowout?

A. No, and that's why I can't quantify this particular vehicle. The literature does indicate there's going to be a slight pull to the left, but it also indicates that you can countersteer that pull.

Q. Okay. So let's go to your fourth opinion on Page 4, or fourth and fifth. Can you read those for the record?

A. "Rather, Ms. Evelyn Moreno parked the Toyota still partially within the left travel lane, occupying approximately 2.1 feet, not accounting for the side mirror of the 11.6-foot-wide inside northbound travel lane, providing approximately 9.5 feet of remaining available space for northbound traffic to pass the Toyota."

Q. Okay. Go to five as well.

A. Then five is, "Given the Ford's width of approximately 6.6 feet, there was sufficient room for the Ford to pass the Toyota within the remaining available 9.5-foot width of that left lane. It was not necessary for the Ford to change lanes in order to pass the parked Toyota."

Q. So -- and we'll focus on the last sentence where you say, "It was not necessary for the Ford to

change lanes." Do you mean it was not physically necessary?

A. Correct.

Q. So in other words, there was enough room for Caylee to remain in the leftmost lane and not directly strike the Toyota?

A. Correct.

Q. Okay. You're not saying with this sentence that it was prudent or reasonable for her to remain in the leftmost lane?

A. No. That's for the jury.

Q. Okay. What is the error rate on the measurements that you provided in these conclusions? Is this -- if it's just a quarter inch...

A. I -- it's either a quarter of an inch, or maybe even better, an eighth of an inch, but let me double-check. It's certainly going to be within that quarter of an inch.

Q. Okay. That's fine.

Why didn't you account for the side mirrors?

A. So in this case, side mirrors, number one, are not often accounted for in an accident reconstruction, number one, because they simply fold out of the way. So the consequences of side mirror contact typically are not -- are negligible, I should say.

Number two, in this particular case, the side mirrors actually did not align on an elevation standpoint. There's actually at least a two-inch gap between the bottom of the Ford Explorer's side mirror and the top of the Toyota -- Toyota Camry's side mirror, so they wouldn't cross paths. So it was negated, because it didn't affect the measurements in this case.

Q. Okay. Do you agree that the crash would not have occurred if Caylee Smith had gotten into the middle lane when she first saw the Toyota Camry?

A. Of course. If the two parties didn't exist at the same time at the same place, yeah, of course, the crash would not occur.

Q. Okay. Do you agree that there's no evidence that Caylee Smith was unable to get into the middle lane as she approached the Toyota Camry?

A. I can't say one way or the other.

Q. Well, I'm just asking you, Have you reviewed any evidence that says that it was -- she could not have gotten into the middle lane as she approached the Toyota Camry?

A. I haven't reviewed any evidence that tells me one way or the other.

Q. Well, I -- I guess what I'm asking is, Have you seen any evidence that shows you one way, which is

that she could not have gotten into the middle lane as she approached the Toyota Camry?

A. Correct, no, just like I hadn't seen evidence of the other way.

Q. Okay. So you did conclude that the Ford Explorer did not strike the Toyota Camry?

A. Correct.

Q. Okay. Is that partially because there's no paint transfer?

A. Paint transfer is certainly one thing we look for. Matching damage, damage characteristics is another thing we look for. There was no matching damage to the two vehicles.

Q. Okay. You did conclude that there was some forward motion applied to the Toyota Camry though, right?

A. Yes.

Q. And is that because you saw that the jack stand had been moved?

A. The jack stand had been tilted forward. And my understanding is that was as a result of Nehemias's being thrown into the back of the Toyota and also Evelyn getting pushed into the back of the Toyota.

Q. So and I should have asked a predicate question. Your understanding is that the jack stand had been placed on the left side of the vehicle by the

blown-out tire on the driver's side --
A. Yes.
Q. -- before the accident?
A. Correctly.
Q. And so presumably, it was correctly seated before the accident?
A. Presumably.
Q. Okay. And then you saw via the pictures that the jack stand -- basically, can you describe how it had moved that allowed you to conclude that forward motion had been applied to the Toyota Camry?
A. It tilted forward a little bit.
Q. Okay. As opposed to tilting laterally?
A. Correct, or backward.
Q. Or backward, right.
A. Mm-hmm.
Q. So if lateral force was applied to the Toyota, how would the jack stand have moved?
A. It would have either slid or tilted.
Q. Okay. Tilted the same way it did in the pictures you reviewed, or tilted to the side?
A. Well, it would tilt to the side that it was pushed at.
Q. Okay. So the jack stand is sort of a good barometer for the direction of the force applied to the

Toyota, right?

A. Not the total direction of the force, because you're certainly going to have resistive lateral force from the tires themselves. A little bit of longitudinal resistance from the right front axle, which is locked by the transmission.

Q. Mm-hmm.

A. So you're going to have varying levels of counteractive forces. So the net movement of the Toyota doesn't tell you the total direction of the contact force. It just tells you what the summation of the forces resulted in.

Q. Okay. So you could -- do you have any idea of the resistance of tires versus the resistance of the front axle, which one -- which resistance is greater?

A. The lateral resistance is going to be greater.

Q. The lateral resistance will be greater. Okay. Got it.

So I think in your opinion -- this is on Page 7 -- you said that the Toyota appeared to have lunged forward by a few inches; is that right?

A. Yes.

Q. And you concluded there was no lateral movement of the Toyota, correct?

A. Correct.
Q. Now, is that the same as concluding that there was no lateral force applied to the Toyota?
A. No.
Q. Okay. So it's possible there was lateral force applied to the Toyota?
A. I do think there was a slight angle from Nehemias's body probably coming from, I would say, the 5:00 or 4:00 direction, if 12:00 is straight ahead.
Q. Okay. So you think that his body was thrown, if 12:00 is straight ahead, his body is thrown to the 4:00 to 5:00?
A. It came from the 4:00 to 5:00 direction.
Q. Okay. So if the middle of the Toyota has a clock on it, you're talking the 4:00 to 5:00 point on the Toyota is where Nehemias hit it?
A. Exactly.
Q. Okay. And you stated, I think it's later, that, based on the tire marks created by the flat tire, it didn't appear that there was a lateral movement, right?
A. Correct.
Q. So meaning that the Toyota remained in that groove or tire mark?
A. Right. Meaning the -- there were no forces

applied to the Toyota that exceeded the lateral resistance of the tires.

Q. Okay. So let's see. On Page 8, yeah, that's -- your opinion is the Toyota did not move -- it did move front to back but not laterally?

A. Correct.

Q. Okay. What damage occurred to the Toyota Camry, to your knowledge?

A. The back right tail lamp housing, the plastic housing was cracked; there was body matter transfer on the back bumper inside of the trunk lid and on the right quarter panel and also on the right rear door.

Q. Okay, okay. Were you aware that the trunk would not close after the accident?

A. I was.

Q. Do you know how that damage occurred or why it wouldn't close?

A. Likely due to contact forces applied to the trunk lid itself from Nehemias's body being thrown into the Toyota.

Q. Okay. Into the trunk lid?

A. Yes.

Q. Okay. So on Page 9, you say that the damage to the Toyota is, quote, Consistent with post-impact contact with the body of Mr. Nehemias Pivaral Santos's

body; is that right?
A. That's right.
Q. All right. Can you explain how you reached that conclusion?
A. So the contact with the Ford, we're starting there, because that's what occurred first, and that's what projected Mr. Nehemias into the Toyota. That contact occurred at the left front corner with only his head, which his head at that point was bent over, bent down at an elevation of 3 to 3 1/2 feet from the ground and extending beyond his center of gravity.
Any offset collisions outside of the center of gravity is going to cause a rotation and also a diagonal trajectory. We typically call this a fender bolt, so it will throw you forward and to the side, creating --
Q. Away from the force?
A. Away from the car.
Q. Okay.
A. So almost like a wedging effect is the best I can say, so a diagonal throw. And that's really what happened here was the offset contact with his head offset from his center of mass and contact with the left front corner of the Ford caused his body to rotate counterclockwise and was thrown diagonally towards the

Toyota at that 4:00 or 5:00 direction.

That then caused -- the contact between his body and the Toyota occurred. His body essentially bounced off of the Toyota back into the travel lane, towards the Ford again. At that point, the Ford had already progressed about 9, 10 feet. And then we see this -- I guess it would be the third contact with Mr. Nehemias's body against the left quarter panel of the Ford as Mr. Nehemias bounced back into the Ford.

Q. Okay. So is any of the damage to the Toyota circular in nature?

A. Not that I saw.

Q. Okay. Would you describe it as any other shape, damage to the Toyota?

A. The damage to the Toyota looked consistent with damage to blunt soft tissue versus any rigid, hard objects.

Q. Okay. So you're saying you don't think his head hit the Toyota?

A. I didn't see any evidence of that. It certainly could have; it just didn't damage the Toyota.

Q. So I mean, there's brain matter and skull fragments on the Toyota Camry, right?

A. Yes.

Q. So it's possible his head hit, but you're

saying there's no damage to the Toyota consistent with a head hit?

A. Right. The primary contact was to his head from the Ford, which I think is what opened the skull. Any secondary contact is going to be significantly less in magnitude, because he's not picking up the entire momentum of the Ford since it's that offset hit. So any secondary or tertiary impact is going to be significantly less in magnitude and may not cause physical damage.

Q. Okay. Do you have any opinion as to what part of Nehemias Santos's body did hit the Toyota?

A. I don't have it refined to that specific level.

Q. Okay. Any opinion on what part of Nehemias Santos hit the taillight?

A. No. I don't have it refined to that specific level.

Q. Okay. That's fine.

Any opinion on which part of Nehemias Santos hit Evelyn Moreno?

A. No. I don't have it refined that much.

Q. Okay. Do you disagree or do you -- do you believe that Evelyn Moreno's story that she was hit by the body is inconsistent with the evidence?

A. No. I think it works.

Q. Okay. How?

A. Well, she is standing in the trunk lid opening. When you project a body after impact, the -- especially when you have an offset impact that causes rotation, limbs are going to extend laterally significantly due to that rotation. So the envelope at which Mr. Nehemias's body was occupying post impact was pretty wide. His body is going to occupy quite a -- quite a big distance from side to side. So it certainly could have been his legs, could have been his arms, could have been one leg, one arm, could have been his torso; could be anything.

Q. And it's hard to tell, given the forces applied and the fact that the human being is not homogenous -- or, it is homogenous, right?

A. Well, it's articulated. So there's a lot of articulation points that's going to cause it to flail and flip and exist in a lot of different configurations.

Q. Okay. Your conclusion on Page 4 and throughout is that the Ford Explorer struck Nehemias Santos on the right side of his head, correct?

A. Yes.

Q. Okay. So on Page 11, you talk about contact matching, right?

A. Yes. Sorry. You're flipping back and forth

a lot.
Q. Sorry, sorry.
A. Yes.
Q. Okay. So is contact matching how you concluded that Nehemias Santos's head was struck, that the initial impact to Nehemias Santos was at the front left panel or the front left part of the Ford Explorer?
A. Yes. You look at damage to one object versus damage to the other, and it's simply putting the two puzzle pieces back together.
Q. Okay. So -- and I believe you used the phrase "circular contact damage" on the Ford Explorer?
A. Yes.
Q. All right. What does that phrase mean?
A. It is the shape of the damage profile to the Ford.
Q. Okay. So if you'll flip to Page 54 of your report -- the paper copy, actually. I'm going to ask you to draw something. Can you draw for us on Figure 70 where the circular area of damage is?
A. You can't see it in that photo, but you can see it quite well in Figure 70. And Figure 68 and 67 are really good pictures as well.
Q. So let's -- let's do it on -- let's start with 60- -- let's do 67 through 70, right?

A. Actually, it goes back as far as -- 65 is where you can start seeing the circular nature. 65 is a good one.

Q. Okay. All right. Well, let's do 65 through 70. If you'll just take a pen --

A. Sure.

Q. -- and draw and put your initials.

MR. DUBOFF: Do we want to -- do you just want to use red?

MR. WHITE: Yeah, red is probably better.

THE WITNESS: I don't have a red pen.

MR. WHITE: I might have a black pen.

MR. DUBOFF: I have about 14 red pens.

MR. WHITE: Oh, look at that. All right.

MR. DUBOFF: I like writing in red.

THE WITNESS: He's an angry writer.

MR. DUBOFF: It's these associates.

MR. WHITE: Yeah.

BY MR. WHITE:

Q. I just -- put your initials by it so they don't think that, you know, sneaky opposing counsel put it on there.

A. I think that's good. I marked Figures 65 through 70.

Q. Okay, perfect.

What was the contact radius?
A. Consistent with the size of the head. I didn't get a precise measurement.
Q. Okay. Could you measure the contact radius?
A. I suppose if I put enough analysis into that, sure.
Q. Okay. You need at least half a circle to calculate a radius, right?
A. Oh, I meant in the form of doing a photogrammetry analysis.
Q. Okay. But you didn't here?
A. No. It was consistent enough.
Q. Okay. So you said it's consistent with the size of a head?
A. Correct.
Q. How large was Nehemias Santos's head?
A. The general size of his head -- I was provided some photographs of him before the incident.
Q. Okay. Do you have any measurements of Nehemias Santos's head?
A. Not specifically. I can certainly estimate it, just as I estimated this damage. They're both consistent in nature and -- and rigidity. It was the only thing that matched the characteristics of this damage.

Q. Okay. So are you saying that the damage is not consistent with hitting his shoulder?

A. No, it's not, because you actually see the brain matter on the end of the fender. The tip of the fender was pointed, and he had a large hole in the right side of his head, I guess you could say by the temple. That fender, you can see the brain matter on the fender, meaning that fender physically intruded into his skull.

Q. So can you point to which figure shows the brain matter?

A. I'm going to look at my computer, because these pictures are hard to see when they print. I need to -- so I'm just cycling through the police photographs, just to point out the chip of the skull was on Page 11 of the police photographs.

Q. Did you include that photo in the report?

A. I don't know. Let me check. I may not have just because of the intensity of the photograph. I don't think I did.

Q. So just in the file that you sent me, can you point me to the photo that has the skull chip that you're referring to?

A. So if you go to Materials Received, Photos and Videos, Police Photographs, Scene Photos, and then it's going to be Page 11.

Q. Now, I think we might be looking at something different. Do you know the file name you're looking at?

A. 2200089-Photos, Part 1, Page 11.

Q. Got it, got it.

So the picture you're referring to, isn't that a picture -- that's a piece of skull on the ground, right?

A. Yes. I was just making a side comment as I passed by it that I believe that is the puncture from the fender.

Q. Okay. Well, I guess my question is, What photo do you have that shows brain matter on the Ford Explorer?

A. Yes, sorry. I'm going there. I just got sidetracked while cycling through the photographs.

Q. And while you're looking, I'll point out on Page 11, you say that, quote, There was blood and body fluid/matter within the round contact damage, specifically to the pointed leading edge of the left front fender of the Ford," correct?

A. Yes.

Q. The next sentence says, "There were pieces of skull and brain matter found on the roadway." So do you think maybe -- I mean, I'm going off of your report, right? Do you think the brain and skull is found on the

road?
A. I think that the fluids in the damage with the consistency of the peeled-back metal fender were all consistent in size.
So damage match is generally looking at multiple different configurations or --
Q. Sure.
A. -- match points, right? Like, a puzzle has multiple jagged edges, that other puzzle's jagged edge.
So in this particular case, we had the circular nature of the damage to the hood and the headlight; we had the peeled-back fender with the body matter on the inside and outside of the fender, suggesting a puncture; we had the punctured skull on the ground with the brain matter; we have all of the body fluid within the circular contact that all of the jagged edges lined up to establish that that was the point of contact.
Q. Well, just to be specific, you don't see any skull fragments on the Ford Explorer, do you?
A. No, no, I don't think I saw skull fragments on the Ford.
Q. You don't -- you don't see obvious brain matter on the Ford Explorer?
A. Yeah, I would just call it body matter. I

don't know how much delineation we can do of that spray. Certainly, there are chunks of brain on the ground that are easier to identify. But within the fluid spray of the contact damage, it's hard to identify, is that brain fluid, blood? There's certainly --

Q. Okay.

A. -- a combination of fluids in there.

Q. Okay. So would you agree that it's possible that the damage to the Ford Explorer by the headlight that you've identified as circular damage could have been caused by a shoulder?

A. I disagree, because now you are completely missing what contacted his head.

Q. Okay. How do you mean?

A. We need to find a match. And if you put his shoulder in place of where the head contact actually occurred, now no head contact happens.

Q. To the Ford Explorer?

A. To Mr. Nehemias.

Q. Well, isn't it possible that Mr. Nehemias hit his head on the Toyota or on the pavement?

A. Not based on the damage matching we see. There is a nice fit. And suggesting otherwise would just be purely speculative and ignoring the amount of match we have here.

Q. So let's talk about just matching on the Ford Explorer, right? Is the contact on the Ford Explorer inconsistent with a hit to Nehemias's shoulder, either right or left?

A. It is. It's not as circular as his head.

Q. Okay. So is it possible -- is the contact damage on the Ford Explorer consistent or inconsistent with hitting Nehemias Santos's elbow?

A. Inconsistent.

Q. Okay. How come?

A. In size.

Q. Okay. What about a fist?

A. Inconsistent.

Q. Okay. And this is all based on -- you think only a head stuck in front of the Ford Explorer could have caused the damage to the Ford Explorer?

A. What I'm saying is the size, the shape, and the magnitude of the damage is consistent with hitting the size of a skull that is hard and would create a circular imprint like we see in the Ford. There is no other explanation for that damage other than your speculation. What I do see here is a nice damage match between his skull and the left front corner of the Ford. There is nothing else that would cause the relative contacts to both objects.

Q. So are you saying that the contact damage on the Ford Explorer could never be caused by impact with a shoulder, a fist, or an elbow?

A. What I'm saying is it's not consistent with that. I don't ever like to use the word "never" or "always." We don't speak in absolutes.

Q. So it is possible?

A. What I'm saying is, to a reasonable of engineering certainty, Mr. Nehemias's head contacted the left front headlight of the Ford. That is the only reasonable explanation for both characteristics to each point of contact.

Q. I guess my question is, Is it possible that the contact damage to the Ford Explorer was caused by contact to a shoulder, an elbow, or a fist?

A. I don't think it is.

Q. So it's not possible?

A. I don't think it is. It does not exhibit the characteristics of those other shapes.

Q. Okay. So what testimonial evidence -- so not physical evidence, but depositions that you reviewed -- indicates that the initial impact to Nehemias Santos was to the right side of his head?

A. Oh, everybody, I believe. They said he was bending over picking something up, into the travel lane.

Q. So did anyone testify that the initial impact was to Nehemias Santos's head?

A. Well, to be fair, I don't know how much these witnesses actually saw, despite what they said they saw. But what I can say is their testimony indicated that he was bending over, in the process of picking something up, which is identical to the damage matching we see here.

Q. Okay. So you agree that -- can we agree that no witness has testified that the initial impact was to the right side of Nehemias Santos's head? That's just not something someone said? You're inferring it, but that's not been said by anybody?

A. Well, I'm not inferring it; I'm concluding it based on the damage matching.

Q. Okay. But there's no separate testimony from somebody that says, Nehemias Santos, I saw his head get hit by the Ford Explorer"?

A. I'd have to reread it, but I'll take your word for it. Certainly, this analysis is based on objective evidence --

Q. Okay.

A. -- not testimony, so I simply just make comparisons.

Q. Okay. So can we agree that your opinion in this report is that there's no damage to the Ford

Explorer below the 3-foot mark?
A. Correct, on the front face.
Q. On the front, you're right.
We agree that there is damage on the side of the Ford Explorer below the 3-foot mark?
A. Correct.
Q. Okay. So is that an important part of your opinion, not an important part? I -- I'm just -- I want us to nail it down.
A. Well, everything is important. I don't want to give anything more merit than another, but that is certainly a key component in that there is no existence of Mr. Nehemias below that contact point.
Q. So are you able to infer -- from the contact matching and the lack of damage below the 3-foot mark, that's how you've reached the conclusion that is shown in some of your figures that Nehemias was leaning forward with his head out from his body, and only his head was struck initially, right?
A. Exactly. It's quite a smoking gun with -- when you put all of the jagged edges together of the puzzle piece, it's the only puzzle piece that fits.
Q. Okay. Now, there's no damage to the Ford Explorer that you've been told about from one of Caylee Smith's prior accidents, right?

A. My understanding was there was no damage to the left front corner prior to.

Q. Okay. At all? Like, I mean, I just -- I want to make sure, you know --

A. Well, certainly not to this extent.

Q. Okay. So -- but you were never told that there was some damage on the Ford Explorer, but that was caused by one of Caylee Smith's prior accidents in the Ford Explorer?

A. I was never told that. But again, this damage has Mr. Nehemias's blood in it, so I don't know if I necessarily needed to be told that.

Q. Fair enough.

I just -- I want to make sure that, coming into this investigation, your assumption or what you concluded was that the Ford Explorer was in -- I don't want to say perfect condition, but there was no body damage or mechanical damage to it prior to impacting Nehemias Santos?

A. I think that assumption may be more important when you don't have a lot of damage to work with. But in this particular case, we have such strong matching evidence that there is no question of if it was preexisting.

Q. So -- and it's not just not matching evidence

that you're relying on; it's the lack of other damage that would -- you know, that kind of -- that's how you're able to infer where the damage happened to Nehemias Santos, right?

A. Well, it's everything, all of it together. It's the elevation of the damage, the size of the damage, the exact location of the damage inboard, the characteristics of the damage itself consistent with the characteristics and rigidity of a skull, the body matter in the damage itself, the brain matter on the road, the skull piece on the road consistent with the fender tip. Everything is so overwhelmingly consistent that there is no way, to a reasonable degree of engineering certainty, that we can conclude anything else.

Q. Fair enough. All right.

Would you agree that any evidence of damage to the front of the Ford Explorer below 3 feet would require you to revisit your conclusions?

A. No. Because in addition to that, if Mr. Nehemias's body existed below that damage, now you're applying the force closer to his center of mass. He is now going to be projected more forward than lateral, and he's going to be subsequently run over because of the trajectory of the Ford. He's going to essentially inherit the trajectory of the Ford because of all the

momentum transfer if his body was struck by the front bumper.

Q. Okay. So you think -- so if there was damage below the 3-foot mark on the front, that would imply that Nehemias Santos had moved more forward than laterally?

A. Yes, which would not result in the subsequent damage we see on the Toyota, would not result in the subsequent damage we see to the left quarter panel of the Ford. There is no other solution that matches all of the evidence. There's one unique solution that matches every piece of evidence. We can't ignore evidence; we have to consider it all.

Q. Sure, sure.

So one of the pieces of evidence is the lack of damage to the front end of the Ford Explorer below the 3-foot mark, right?

A. One of the many is the lack of damage that would be generated from impacting a center of mass of a body.

Q. Fair enough. All right.

So go to Figure 70 of your report.

A. Okay.

Q. I think that's page -- well, you beat me there. All right. So if you look down, you see the tire, right?

A. I do.

Q. Now, you see that there's sort of a -- the plastic piece that's kind of been ripped off a little bit?

A. I do.

Q. Go down to that -- it's not the bumper, but it's the plastic bit below the white bumper on the front, right? Do you see any deformation of that part of the plastic bumper?

A. Let me just see it on my computer. Okay. I, do.

Q. Okay. So go to Page 14 of the Richland police officer's photos. I actually don't see it in your file. Recall that?

A. No, I don't have a Page 14.

Q. Well, I'll show you mine. So this is -- and this is the 14th page of --

A. Oh, that's in a different folder. That's why.

Q. Oh, okay. Which folder is it in on yours?

A. That would be under the Ford Explorer folder.

Q. Okay. Let's go back to the Ford Explorer photo, then. Ah, yes, there it is, Page 14.

A. Okay.

THE VIDEOGRAPHER: I'm sorry. Is your mic

still clipped?

THE WITNESS: Oh, I walked away. Sorry.

THE VIDEOGRAPHER: That's okay. Thank you.

THE WITNESS: You're welcome.

BY MR. WHITE:

Q. Okay. Do you see the dent in the lower part of the front plastic bumper?

A. I do.

Q. Okay. So did you miss that dent in your analysis?

A. No. That's just not a dent from impacting the center of mass of a pedestrian.

Q. So -- but that is damage below the 3-foot mark on the front part of the Ford Explorer, isn't it?

A. Yeah, I guess you're right. Maybe I should have been more specific in my words. But that damage is not from impacting the center of mass of a pedestrian. That also could have been generated by his shoes or debris or even the bending of the black plastic trim. So whatever caused that damage was not Mr. Nehemias's physical body in front or existing in front of the Ford, because we would see damage between that and the headlight, but we do not.

Q. So on the bottom of Page 8, you say, quote, "There was no front face contact damage below 3 feet from

the ground." Would you want to revise that statement?
A. No. That's really on the left-side corner. It's a plastic damage that, again, could have been as a result of the bending of the plastic fender.
Q. So you think that the bending of that bumper was caused by the bending of the fender?
A. Well, I'm suggesting that could be an explanation. His shoe being thrown off could be an explanation, a tool he was holding could be an explanation. That is not contact with a body, and that's what we're talking about.
Q. Okay. So how -- if, in your theory, he sticks his head out into the road to get hit by the Ford Explorer and then gets hit by the Ford Explorer, and then, as you say, he doesn't get into contact with the Ford Explorer again until it's kind of at 9 feet, how do his shoes create that damage to the front bumper?
A. When you are hit offset from your center of mass, your limbs will flail outward significantly. So we are articulated. Our elbows, shoulders, that could be any of the articulation points as he's rotating or spinning. It could be his legs; it could be his shoes, his feet, his hands; it could be a multitude of things. But what it is not is his physical center of mass.
Q. Okay. So if, as you said, he gets hit in the

head, in your estimation of what happened, he spins counterclockwise, right?

A. Yes.

Q. So the front bumper would have been past his body at that point when the spin begins, right?

A. Yes. But again, your limbs --

Q. But how does he get in front of the car after he's been hit to cause that damage?

A. Right. So if you actually look at the demonstrative I have of him bending over, the diagram, you can see his hands hanging in that general area. That could certainly be an explanation for that dent. That could be preexisting.

What I am saying -- and I think you're missing the point -- this is not contact with the center of mass of his body. And that is the point I'm making is that the only way to exhibit this elevated contact to the headlight without significant body damage to the bumper itself means the lack of existence of his body in between or below the headlight. Now, what this dent in a piece of plastic is, I don't know. But it doesn't matter.

Q. Because you didn't mention it your report, did you?

A. No. And again, it doesn't matter, because what I'm saying is there is no body -- center of mass

body contact.

Q. Okay. So let's go to Page 14 --

MR. WHITE: Oh, I'm sorry. Let's take a break.

THE VIDEOGRAPHER: The time is 2:18 p.m. We are off record.

(Break was taken from 2:18 p.m. to 2:24 p.m.)

THE VIDEOGRAPHER: The time is 2:24 p.m., and we are on record.

BY MR. WHITE:

Q. Okay. I want to jump to Page 14, right? On Page 14, you say, quote, had Mr. Santos not bent over into the travel lane outboard the parked position of the Toyota, the collision would not have occurred, correct?

A. Correct.

Q. Okay. Now, are you offering the opinion that Mr. Santos bent forward immediately before being hit by the Ford Explorer?

A. I can't offer that opinion. I don't know.

Q. But you say, right, you don't know -- you -- your opinion is he was bent over when he got hit?

A. Correct.

Q. But you don't know when he began bending over or how long he'd been in that position?

A. Correct. Another reason I can't do an

avoidance analysis, because I don't know when that stimulus began.

Q. Okay. So do you -- I take it you don't know how long he was in the bent position before he was hit by Caylee Smith?

A. I don't.

Q. Okay. Did you take body measurements of Mr. Santos in this case?

A. No. I had pictures of him to establish that he was a generic, 50th percentile male.

Q. Okay. So did you use 50th percentile male proportions when creating your demonstratives?

A. I did.

Q. Where are those percentiles found out?

A. Did I publish that in my file? Let me see. If not, I can add it in there really quick. Yeah, I apologize. I don't think I added that in there. But the CDC publishes the Anthropometric Reference Data Manual, last dated January 2021.

Q. Do you believe the CDC? I'm joking.

Okay. Why -- why didn't you also say that this collision would not have occurred if Caylee Smith had vacated the leftmost lane when she first saw the Camry?

A. Well, I did concede that, had she been able

to move over by another foot, there was no crash. But I can't say whether she was capable of vacating that lane.

Q. Okay. So your eighth opinion on Page 4, right, you're talking about some tire marks that were photographed to the right of the Toyota?

A. Yes.

Q. Okay. So your conclusion was, quote, The location and characteristic of these tire marks were indicative of one or more vehicles making an invasive swerving maneuver from left to right at the location of the parked Toyota.

A. Yes.

Q. Okay. So -- and you made that determination by comparing the grooves in the tire marks with the grooves on the tread of the Ford Explorer?

A. Well, that opinion wasn't based on the grooves.

Q. Okay.

A. The grooves were what was able to indicate that those were not the Ford Explorer's tires.

Q. So -- and just so we're both looking at the same picture here, Figure 88, right? So you identified two patterns in Figure 88, right?

A. Yes.

Q. So the leftmost of those patterns, you have

on Figure 88 only as three tread grooves, right?
A. Yes.
Q. So that groove or that tire mark, you've excluded as being caused by the Ford Explorer, because it has fewer grooves than are on the Ford's tread?
A. Exactly.
Q. Okay. Now, there's another tire mark to the right of the one with three tread grooves. And the tread -- the tire mark to the right, you couldn't count the number of grooves in it, could you?
A. I could not.
Q. All right. And you excluded that one based on the width of it?
A. Yes.
Q. Okay. So how did you measure the width of that tire mark?
A. That was done with a photogrammetry analysis.
Q. Okay. So if you look at the tire mark that's to the right, the one that you couldn't count the grooves on, does it look like it displaced -- or that the tire that made that mark also displaced some fluid?
A. It's hard to say whether that fluid is on top of the tire mark. What I would expect if it displaced fluid is we would be able to see the tread grooves better. The reason I don't think we can see the tread

grooves is because I think there's a little bit of lateral slippage that just misaligns the grooves ever so slightly.

And when you look ahead at the tire mark more towards the top of the picture, that gives more of the textbook outboard characteristics of a loaded tire. When you swerve, you are causing a weight shift to one side of the vehicle, which is going to load that side's tires. Anytime you overload a tire, it's going to give that characteristic textbook tire mark.

Q. So on Figure 88, for the tire mark to the right, you've actually added some black lines, right, to kind of show us where the boundary of the --

A. At the bottom of it, yes.

Q. Right.

A. Mm-hmm.

Q. Can you say definitively that that tire mark, the one where you couldn't count the grooves, that that tire mark is actually caused by rubber being put on the road or displaced fluid that, like, track the tire?

A. That's what I'm saying. If it was displaced fluid of a tracking tire, which means it's free rolling in line with its angle, you would be able to see more of the tread grooves from going through fluid.

Q. But you would agree that it looks like some

of that fluid has been displaced by a tire in line with the tire mark that you've identified where you can't count the grooves, right?

A. I would argue it looks more of, like, a classic tire mark with some fluid on top of it by the black lines.

Q. Okay. So if there's fluid on -- you don't think that that fluid that's on top of it was caused by a tire rolling through the fluid?

A. I don't think so. That, I'm not going to fight hard on. It's certainly possible, but I don't think so.

Q. Okay. Because if that tire mark was caused after the fluid was on the ground, then that tire mark happened after the accident --

A. Right.

Q. -- right?

And it's possible that both, or one of, at least -- and we don't know that these tire marks were caused before the accident, right?

A. I can't say exactly when they were generated. What I can tell you is the characteristics of them and the exact location and size of them. That's what I figured out.

Q. So you said that it appeared that they

were -- let's see here -- indicative of one or more vehicles making an evasive swerving maneuver, right? So where did you get that those tire marks were caused by a vehicle making a swerving evasive maneuver?

A. So they arc to the right at angles consistent with emergency swerving with loading patterns consistent with the weight shift. During an emergency swerve, the weight is going to get thrown to the left side of the vehicle, overload those tires, generating that textbook outboard dark line patch along with the curvature of the mark.

When you actually put this on a diagram, you can appreciate the curvature of the mark, because this is a very zoomed-in photo. You're only segmenting a small portion of a curve. It's hard to see, kind of like flat-earthers, I should say. But this -- when you look at a diagram, you can appreciate the swerving nature of the tire mark.

Q. So -- but you don't know if those tire marks in your -- well, strike that.

Your opinion is that these tire marks were caused by someone swerving?

A. Yes.

Q. Okay. But you don't know if these swerves were made as a result of someone trying to avoid the

Camry, or if those swerve marks were put there before the Toyota Camry was there?

A. You are right.

Q. Okay. All right. And can we agree that it's possible those track marks were made after Nehemias Santos was killed?

A. I would probably fight harder on the left tire mark than I would on the right tire mark. I do think that left tire mark is prior to. I think that has more classic characteristics of a real tire mark versus a tire traveling through fluid.

Q. Okay. So your ninth conclusion on Page 4 is that there was no physical evidence or indication in the GPS data or the bearing data that the Ford was traveling or steered on or towards the left shoulder leading up to the incident location, as suggested by the plaintiff?

A. Yes.

Q. Okay. So one of the reasons you reached that conclusion is based on the bearing data from the infotainment center, right?

A. That's correct.

Q. Okay. And let's see here. So if you can flip to Page 12 of your report.

A. Okay.

Q. All right. So just -- I won't make you read

all this. But just to summarize your opinion here, you say that the bearing data shows that she was traveling with a -- quote, consistent with the parallel orientation with the roadway leading up to the collision location.

A. Exactly.

Q. So is that -- you know, I don't -- we'll go back to our questions about GPS and whatnot. But you're not swearing that the GPS data is 100 percent precise as to global position, but you do think that looking at all the GPS positions in a line shows that she was moving along the roadway in a straight fashion?

A. Yes. I believe you can establish trends from data points that all have the same tolerance.

Q. Okay. And you say there's no documented positional deviation from the left northbound travel lane towards the left shoulder in Caylee's track points?

A. Yes.

Q. So what you're saying is there's nothing in the electronic data that shows that she went left on the leftmost lane, like, towards the left shoulder?

A. Correct. She never deviated to the left, nor did the bearing data or the bearing angle indicate that she moved left.

Q. Okay. So are you relying on the bearing data there? Do you trust the bearing data?

A. Well, what I'm saying is when you combine all of this, that's the likely conclusion.

Q. You've validated the bearing data; the bearing data lines up with everything else, is what you're saying?

A. When measured, the bearing data matches the roadway orientation --

Q. Okay, okay.

A. -- until her final swerve.

Q. Okay, right, right, right.

So -- and you admit there's a little bit of wiggle room here on the GPS coordinates, because they've been validated to only 3 1/2 to 7 1/2 feet? That's your position?

A. The global position. But again, we're using the theory of relativity, and we're taking a rather small time sample and analyzing the change between points and tracking any trends or changes in those points to help us establish any relative movement. Since we know all of these points have relatively the same error rate, because they're collected in the same time frame at the same environmental location with the same number of satellite signals, we can conclude that, if there was any deviation in lateral position or bearing, we should see it.

Q. Okay. All right. So I take it what you mean

is we don't know exactly where she's at on the road from the GPS data within 3 1/2 to 7 1/2 feet, but we can tell that she was going straight, wherever she was in that -- on the roadway, right?

A. Right. It's kind of like the difference between accuracy and precision. Accuracy is where on the road you are; precision is the consistency of the data.

Q. Okay, okay. So your conclusion is that the 3 degrees -- well, strike that.

Let's -- just for the jury, can you explain the bearing data? Like, how does bearing work, like, if you're looking at a quadrant compass?

A. So there's 360 degrees in one full circle, 90 degrees in a quarter circle. So if you rotate 90 degrees to your right, you rotate a quarter of the way around; 180 is one-half the way around. So 3 degrees is just a slight steer to the right relative to the whole 360.

But what the vehicle dynamic principles show is that, at highway speeds, particularly at 90 miles per hour, when we apply the emergency swerving equations to a vehicle traveling at these speeds, the maximum bearing angle during that swerve is about 3.1 degrees, which precisely matches the bearing angle change that we see around the location of impact.

So we know that data is capable of picking up these changes in lateral position and bearing angle. We see the lateral position deviate to the right, and we see the bearing angle deviate clockwise. So we know it's picking up changes, and we see no changes before then.

Q. Okay. So you're saying the literature shows that an emergency swerve to the right would normally, at most, be 3 degrees to the right?

A. At the speed.

Q. At the speed, right.

So the fact that the infotainment bearing data showed a 3-degree swerve to the right helps you validate the data from the bearing?

A. One of the many validations, yes.

Q. Okay. But I -- you trust the bearing data? That's where you're at?

A. Yeah. I mean, certainly, I admit that there are tolerances and errors. But what I can say is I've independently analyzed it, and it appears to be accurate in this case. We always try to independently validate digital data --

Q. Sure.

A. -- to see its accuracy, and it matches very well with the environmental evidence and the vehicle dynamic principles.

Q. So there was a swerve -- well, I'll take a step back. At the 2:48:51 mark, her bearing is 340 degrees, right?
A. Yes.
Q. And then the next second, her bearing is 343?
A. Yes.
Q. And so that's where we're getting the 3-degree change, right?
A. You got it.
Q. How many feet in lateral change does that correspond to, and how do you calculate that?
A. Lateral feet over the course of -- looks like anywhere between 130 and 250 feet of longitudinal distance --
Q. Well, just -- and I'll interrupt you.
It's a right-hand -- it's a right angle triangle, right? So all you're doing is once you know the degree change, right, you can figure out what the distance is between the track that she would have been on without the bearing change versus the longitudinal distance that she travels, and then you can -- you can calculate the change, right?
A. It's not that simple, because you don't instantly change angles like the corner of a triangle does. It's a quadrantic curve --

Q. Okay.
A. -- that you gradually quadratically increase your heading angle. So it's more complicated than just a triangle. But what I can do is look at the empirical equations to calculate the lateral movement.
Q. So what is the lateral movement of a 3-degree swerve to the right like the one that she conducted?
A. Let me see.
Q. And tell the jury; sort of walk us through how you figure it out.
A. So what I'm doing is I'm using the equations where the inputs are speed and lateral steering distance side to side, and it establishes what the average lateral acceleration -- the rate at which you are changing laterally -- that's what defines the curve. It's not an instantaneous change like a triangle, it's a curve, and then also the lateral movement during that time of that distance segment. And so I don't have that teed up, so I'm having to do this iterative process to answer your question. It's about 5 feet.
Q. Okay. All right. That's -- and I'm not an engineer. I just used a triangle, and I came up with about 6 feet, so --
A. All right.
Q. -- I'm close enough, right? I have nothing

better than the Pythagorean theorem to use, so you have better tools, okay?

So what was Caylee's bearing when she sent the text message to Gracie?

A. I don't have that teed up, but I can certainly try to go look for that.

Q. And just -- I think we agree that the text message happened at the 2:48:43 mark.

A. Okay. Her bearing at 2:48:43 was 340 degrees.

Q. And we agree that's her bearing when she sent the text message?

A. Yes.

Q. Okay. So how fast was she going when she sent that text message to Gracie?

A. 87.8 miles per hour.

Q. Okay. And round it up to 88?

A. Sounds good.

Q. Okay. So she was on the 340 bearing for about three seconds, right?

A. Until when?

Q. Well, about three seconds later, does she change her bearing?

A. There's a 341, 340, there's some rounding. It rounds to the nearest whole number.

Q. So at what second did her -- so she's on the 340 bearing after sending the text message. At what second does she change her bearing to 341?

A. Like, about five and a half seconds before impact.

Q. So it's about three seconds after sending the text message, right?

A. Sure.

Q. Okay. So a change from 341 to -- excuse me, a change from 340 to 341 is, what, a rightward shift?

A. Yes.

Q. Of about how many feet using the calculation you used earlier?

A. Well, the problem is you're rounding. That very well could have been a 340.4 at one moment and then a 340.5 at the next one, and it's going to round to the next whole number. So --

Q. How do you know that it's rounding to the whole number?

A. Because the precision -- they only give us whole numbers.

Q. Okay. So you don't know which way it's rounding, right?

A. Well, it depends on which side of the half it's on.

Q. Well, you don't know how close it is - --
A. No.
Q. -- when they round up, right?
A. Right. And that's why this hypothetical question is tough, because I don't know where within that range it actually was.
Q. Let's say it's a full degree. Let's just take the data as it shows, right? It's a full degree change from 340 to 341, right, traveling at the speed at which she is at when she makes the bearing change, so that's 85 miles an hour. How many lateral feet to the right has she moved?
A. It's going to be about less than a quarter of a foot, so 3 inches.
Q. Okay. So she's gone right.
Now, does she change her bearing back to 340 in the next second?
A. Well, the data either rounds to 340 in the next second, but I don't know if it's necessarily her changing it back to 340. But certainly, as you drive, you are going to be putting adjustments into your steering, but very slightly, to maintain a straight heading. So anything less than 1 degree, you're just getting way too precise.
Q. Okay. But the bearing does change in the

next second back to 340, right?
A. It could round back, yeah. I mean, if it --
Q. Well --
A. -- if it was at --
Q. -- I'm just saying just look at it.
A. Yeah, yeah. The physical data goes 340, 341, because, again, we're rounding.
Q. Okay. So at the 2:48:47, she's got a bearing of 340; and then the next second, she goes to 341 again, right?
A. Okay, yes.
Q. Okay. And so then she goes back to 340 in the next second, right?
A. Or it rounds down to 340, yeah.
Q. Okay. And then she's on 340 until the collision occurs and she moves 3 degrees to the right?
A. Right.
Q. Okay. So do you think the 3-degree move is the result of -- could it be -- could it be closer to 2 degrees?
A. You're right. It's possible. It could be 2 to 4, really.
Q. Okay. We just don't know?
A. Yeah, I mean, because of rounding. It's going to be anywhere between that 2 to 4, but the 3 is

the central value.

Q. Right. And you don't know, like, from your expertise and from reviewing the literature, how accurate the bearing data is on these Gen 3 SYNC devices, right?

A. Right. And again, I'm not establishing her trajectory based on the bearing data. What I'm saying is I've independently calculated what the maximum bearing angle change would be using an emergency swerve at her speeds, and it equates to 3.1.

Q. Okay.

A. And I look at the bearing data on the GPS data, and it shows 3 degrees. So I'm saying it's consistent.

Q. Okay, okay. So you've read Caylee's deposition, right?

A. Yes.

Q. So your testimony -- or her testimony is that she never left the left lane as she approached the Toyota Camry, right?

A. Yeah. It was a little vague on whether she actually breached the middle lane or not. But I think at the end of the day, my consensus or my understanding of her testimony was that she didn't actually breach the center travel lane --

Q. Well, she --

A. -- until after.
Q. She thinks she didn't breach the center travel lane --
A. Right.
Q. -- right? That's her testimony, right?
A. Mm-hmm.
Q. So -- and did you assume that was the case while you were generating your report?
A. Well, I was presented two versions, right? I don't know the exact lateral position of anyone at impact. So what I did was analyze the two versions that are in dispute, Plaintiffs' version and Defense's version, and I'm presenting both of those for the jury, and they can choose.
Q. Okay. So now, if she -- if we assume that she's in the left lane -- and that is her testimony, right?
A. Right.
Q. If she -- that 3 degrees swerve to the right would have put her in the middle lane, right?
A. Yeah.
Q. Okay. How far in the middle lane?
A. Well, we said what, 5 feet?
Q. Mm-hmm.
A. Mm-hmm.

Q. So about -- was it about halfway in the middle lane?
A. Depends where she started from.
Q. Well, taking her testimony as true, right?
A. Mm-hmm.
Q. You know, that she's trying to avoid the Toyota Camry but not be in the middle lane --
A. Right.
Q. -- about how far -- how far away is she from the middle lane at that point?
A. Yeah. I mean, she's about 5 feet into the middle lane, which is quite consistent with the GPS position --
Q. Okay.
A. -- that we see.
Q. So you would agree that when she swerved to the right, according to the GPS and the bearing, she went about 5 feet in the middle lane?
A. Yeah, I think she at least breached the middle lane after her swerve for sure.
Q. Sure, sure.
How wide is the middle lane?
A. I think it's also about 11 to 12 feet wide.
Q. Okay. So she, at -- at maybe the maximum point of her swerves, she's taking up half of the middle

lane, right?

A. Sure.

Q. Okay. So how much damage was on the right side of the Ford Explorer?

A. None.

Q. Okay. So you'd agree that means that she didn't hit anybody on her right when she swerved at the collision point?

A. That's true.

Q. Okay. So why didn't you include in your report, "The middle lane was empty to Caylee Smith's right at the point of impact"?

A. All I can tell you is the point of impact what the status of that middle lane is. We all know lane status can change within seconds. I have no idea what her lane status was five, ten seconds prior, which is the timing of when somebody would start implementing a lane change. Nobody can attest to what the status of that lane was five to ten seconds out. All we can attest to is at the point of impact, she was able to exist in that center lane. That tells us nothing about her ability to be able to change lanes back in time.

Q. Okay. And you would agree, Caylee Smith doesn't remember if there was anybody in the middle lane?

A. Yeah. Her -- she couldn't remember

specifically. I think there was -- yeah, I'll just agree with that.

Q. Okay. So your conclusion is that Mr. Santos's head must have been 1.1 feet east of the outward or the rightmost point of the Toyota Camry?

A. Yes.

Q. And that's due to your equations saying that the maximum degree swerve that Caylee Smith could have conducted was 3.3 degrees?

A. I thought it was 3.1, but you might be right.

Q. I'll take your word for it.

A. I'm not sure.

Q. What is your equation that you're using?

A. That is, again, based on the steering amplitude from Muttart's 2015 paper, 2015-01-1417.

UNIDENTIFIED SPEAKER: I'm sorry. I couldn't see you from the --

THE VIDEOGRAPHER: One moment.

MR. WHITE: I thought it was locked.

MR. DUBOFF: Yeah, I thought it was a dead bolt.

BY MR. WHITE:

Q. Okay. So in -- I take it that equation is based on the speed at which someone is traveling, right?

A. That is a variable, yes.

Q. Okay. So you can swerve more the -- your degree of swerve can be greater if you're going slower, right?

A. True.

Q. Okay. How much greater? Like, is it a sliding scale?

A. It's a quadratic. I don't have an answer to that.

Q. Okay, okay. So that paper says that the maximum that Caylee Smith could have swerved to the right was 3.1 degrees?

A. With these set of facts, yes.

Q. Okay.

A. Her speed and the emergency swerve distance she traveled during that speed.

Q. What speed did you put into that equation when calculating her max swerve?

A. 90 miles per hour.

Q. Okay. Did you test that equation at the lower speed, right, that didn't mean closer to 87 miles an hour?

A. I didn't, no. It would increase it by a tenth of a degree.

Q. Okay. Which would -- would that change your conclusion at all?

A. No. Again, we're rounding to the nearest degree, so a tenth of a degree is just too precise to make any opinions from.

Q. Okay. So do you know how many feet behind the Toyota Nehemias was standing?

A. I certainly modeled it at a given distance, but the testimony seems to indicate within arm's reach. Pretty close.

Q. Okay. So does the physical evidence give you any basis to conclude how far back from the Toyota he was standing? Not lateral; let's just set lateral to the side. But just how far back from the trunk?

A. No. There's really no -- let me rephrase that. Within 10 feet, yes.

Q. Okay.

A. But we can't really get any more precise --

Q. Yeah.

A. -- than that.

Q. You know he's not 50 feet back?

A. Right.

Q. And you know -- I mean, would you say you know he's not, like, 1 foot away from the trunk?

A. I would say it's possible, but I don't know. 5 feet seems reasonable. So I don't have a specific answer for you. But I know it wasn't 30; I know it

wasn't 40; I know it wasn't 250 feet, which is the distance that she would have had to start her swerve from on the shoulder. So for what it's worth, when the witnesses said they saw her driving on the shoulder, they would have had to have seen her driving 250 feet away at that point.

Q. Okay. All right. So on Page 12, you describe in detail the steps needed to remove the Camry's spare tire?

A. Yes.

Q. Okay. So do you believe that most of these steps had been concluded by the time the collision occurred?

A. There's certainly conflicting testimony about what step they were on. I know there was some testimony about either the spare tire was in the process of being picked up out of the trunk, or it was already out of the trunk. The jack, obviously, with the jack arm was already out of the trunk and underneath the car, and they went looking for the -- the tool to take the lug nuts off.

Q. And do you make any conclusions based upon the status of the tire change other than the jack stand?

A. No. I think I just wanted to understand the configuration of the spare tire a little bit better --

Q. Okay.

A. -- to help understand or at least educate the jury, you know, where the parts are supposed to be, maybe what step they were on, just helping the jury understand.

Q. Okay. But you don't know which step they were on, based on the physical evidence you reviewed?

A. Well, I know the tire was out after the incident, and I know the jack and the crank was out. So it can certainly help the jury at least know that that was taken out.

Q. Okay. So what other steps remain if the tire -- if the jack's set and the tire is out of the back of the car, what part remains?

A. The only other step that would be next would be to start taking off the lug nuts, which the tool for the lug nuts should have been with the jack and the crank.

Q. Okay. Do you have any opinion about where the tool to remove the lug nuts -- now, are we talking about that tire iron, or are we talking about something different?

A. Yeah, just the standard stock tire iron tool to take off lug nuts.

Q. Okay. Are there any other tools that you're aware of that were needed?

A. No.
Q. Okay. Do you believe that Nehemias was doing something unrelated to changing the tire when he was struck by Caylee Smith?
A. I don't -- I can't answer that.
Q. Okay. So you don't know what he was doing?
A. No.
Q. Okay.
A. Other than bending over.
Q. Which is based on your analysis --
A. Yes.
Q. -- right? Okay.
A. Mm-hmm.
Q. So how did you take into account Caylee Smith's testimony at her deposition that Nehemias Santos stepped out in front of the Ford Explorer at the last minute?
A. Well, remember, I'm performing an objective analysis and comparing it to the testimony. If I would just simply recite testimony, then what good am I? So I'm using science and objective evidence to figure out what I can determine based on that, and then we can make comparisons.
So it is what it is. It's just direct comparison. Caylee had mentioned something about bending

over, stepping out. I think it's just a game of semantics at that point. But what I can say is the evidence shows that he was bending over.

Q. Okay. What did you -- how do you take into account Caylee Smith's deposition testimony at her deposition that Nehemias Santos was facing the Toyota, like, the side of the Toyota when she hit him?

A. I don't remember that testimony.

Q. Okay. Do you remember her testifying that it was her belief that he's standing in the roadway looking at the back right passenger tire?

A. I didn't interpret it that way. I understood it to be that he was at the back right tire or near the back right tire. I don't recall there being enough detail in the testimony to say exactly what he's looking at. What I will say is this all happened rather quickly, and there were various versions of what she thought she saw. Again, I'm just reciting what the testimony says. That has no bearing on my analysis. I'm relying on the objective evidence and data. I present that to the jury, and they can do with it what they want.

Q. So did you take into account Caylee Smith's written statement to the police where she said that Nehemias was kneeling down to change a tire?

A. So again, you keep using the word "take into

account." I'm relying on objective evidence. So it's not that I'm dismissing or using specific points of testimony. I'm doing my own independent analysis, and I read the testimony. So I'm not necessarily relying on the testimony here. So you're welcome to make a comparison to the jury, but that has no relevancy to what I've done.

Q. But based on your analysis, you do not believe it's true that Nehemias Santos was looking at the -- standing in the roadway looking at the back right tire of the Toyota, right?

A. At least not at the point of impact. Certainly, he could be doing a multitude of things leading up to impact or within a half second or second before impact, which, quite frankly, is when Ms. Caylee would see him. She's not going to see his head at impact; the hood is blocking her view of his head. So I wouldn't expect her to know his exact orientation at impact. She can't see that.

Q. Okay. Now, on Page 14 of your report, you say that, "Therefore, had the Ford driver swerved a foot further to the right, the collision would have been avoided. However, it was indeterminate as to how much advanced notice Ms. Smith was provided of Mr. Nehemias Roderico Pivaral Santos actively bending

over into her path."

A. Correct.

Q. So you modeled out the maximum swerve that she could do at 90 miles an hour, right?

A. What do you mean, the maximum swerve she could do?

Q. Well, you testified earlier that you -- you have an equation that shows that she can only make a rightward emergency swerve of 3.1 degrees when she's traveling at 90 miles an hour, right?

A. Yes, given -- yeah, given the lateral movement, yes.

Q. Okay. So if she'd been going slower, she would have been able to make a greater swerve to the right, correct, mathematically?

A. I suppose I can agree with that.

Q. Okay. So --

A. Again, we're talking a tenth of a degree, so qualitatively, I think I can agree with you.

Q. Well, I'm not telling you how much slower she could have been. If she'd been going the speed limit, right, then it would have been an even greater ability to make a turn to the right?

A. Maybe two-tenths of a degree, because we saw that 10-mile-per-hour difference with a tenth of a

degree.

Q. Okay. I mean, it's quadratic, right? So it might be different if -- you know, exponentially, right?

A. Well, all I'm saying is when you hypothetically asked me the question before, I changed the input from 90 to 80, and it changed the orientation by one-tenth of a degree.

Q. So if you change it to 75, how many tenths of a degree does it change it?

A. I can certainly do that. .35 degrees.

Q. Okay. So if she'd been going the speed limit, she'd have been able to increase her turn to, what, three point -- let's call it 3.5 degrees?

A. 3.45.

Q. 3.45, okay.

And if she'd been going the speed limit and then decreased her speed more, obviously, she'd have been able to turn even more, right?

A. Maybe.

Q. Okay. I mean, mathematically, yes, right?

A. Yes.

Q. Okay. Do you believe that if Caylee had not been texting Gracie, she would have seen the Camry sooner than she did?

A. I can't say that.

Q. Why not?

A. I don't know what traffic conditions were like; I don't know when she was presented the visual sight line to the Camry. What I do know is that she responded to the Camry successfully.

Q. Two seconds before?

A. Whenever she did, she responded like the average driver does to a roadside parked vehicle with a pedestrian --

Q. Well, when --

A. -- so she successfully responded to the Camry. The issue was the secondary imminent hazard that presented itself with Mr. Nehemias bending over.

Q. But she didn't reduce her speed until two seconds before she passed the Camry, right?

A. She reduced her speed by 4 miles per hour, which is --

Q. Two seconds before?

A. Right, which is greater than what the average driver does.

CONTINUED IN VOLUME II

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IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF TEXAS

Civil Action No. 3:22-CV-02714-K

ORIGINAL

ERICK RODERICO PIVARAL GONZALEZ, Individually and as Special Administrator of the Estate of NEHEMIAS R. PIVARAL SANTOS, DECEASED, ERICK SANTOS, and EVELYN MORENO,

Plaintiffs,

vs.

CAYLEE ERIN SMITH & EASTMAN CHEMICAL COMPANY,

Defendants.

___________________________/

VOLUME II

DEPOSITION OF: PAUL J. MONTALBANO

DATE TAKEN: Tuesday, December 19, 2023

TIME: 3:01 p.m.

PLACE: Wingate by Wyndham
5750 Hazeltine National Drive
Orlando, Florida 32822

TAKEN BY: Plaintiffs

REPORTED BY: Jennifer Prohaska
Court Reporter and Notary Public

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C O N T E N T S

E X H I B I T S

- - - - -

S T I P U L A T I O N S

It is hereby stipulated by and between counsel for the respective parties that the reading and signing of the deposition be reserved.

* * * * *

(CONTINUED FROM VOLUME I)

BY MR. WHITE:

Q. Okay. Do you agree that, when going over 85 miles an hour, it's needlessly dangerous to text and drive?

A. Yeah, you are asking jury questions. I can't answer those.

Q. You don't have an opinion on whether or not it's needlessly dangerous to text and drive going over 85 miles an hour?

A. "Needlessly dangerous" is such a subjective term. I'm here to analyze the objective science. You're welcome to present these words on closing. That is not my job.

Q. I'm just asking, you know, you're an accident reconstructionist and you do this for a living, right?

A. Yes.

Q. Do you think it's dangerous to text and drive?

A. It depends.

Q. Okay. Do you think it's dangerous to text and drive when you're going over 85 miles an hour?

A. It just -- it all depends. You've got to analyze every case.

Q. So it might not always be dangerous to text and drive when going over 85 miles an hour?
A. It might not.
Q. Okay. You think it's wrong to text and drive when you're going over 85 miles an hour?
A. You're asking jury questions. I can't answer that.
Q. You don't have an opinion?
A. No. I'm here to apply accident reconstruction analysis. I can't -- I'm not here to say what's right and wrong. That's a jury question. I can't invade the province of the jury.
Q. So you just don't have -- you don't have an opinion about it?
A. I'm not allowed to give layperson opinions. Experts have been stricken for that, so I'm going to stay in my lane. I'm giving you the science. You're welcome to, again, make your attorney arguments. I can't bolster your attorney arguments.
Q. So we go to Figure 89 on Page 64. Can you take that red pen on page -- on Figure 89 and draw where you think Nehemias Santos was standing?
MR. DUBOFF: Object as vague.
A. Oh, my goodness, no, I can't do this.
Q. No, no, sorry. Figure 89.

A. Oh, Figure 89. No, I can't do this. I have a diagram that shows you this. I can't replicate a view with a pen. I've already done this graphically.

Q. So when you say you made a diagram, you're talking about Figures 119 and 120?

A. Yeah. Again, if you recall, I'm not telling the jury where he was. I'm presenting the two provided versions.

Q. I mean, I think you provided some opinions about where -- where he wasn't standing, right? But you don't have an opinion on where he was standing?

A. It's a range, remember? So we have one end of the range is the plaintiff version, the other end of the range is the defendant version. So I'm offering those two versions.

Q. But you've concluded one is consistent with the evidence and one is not, right?

A. What evidence? What do you mean?

Q. You've concluded that the defense version of events is consistent with the evidence, correct?

A. Well, with his final rest, yes. Because he bounces off the Toyota and then back to the Ford so -- in Plaintiffs' version, the Ford is physically occupying his original final rest. Since we know he hits the Ford, he can't occupy the same space at the same time.

Q. Okay. So you don't have an opinion as to where he was standing when he was struck by the Ford Explorer?

A. I don't have a specific opinion. I do have a range that I'm presenting.

Q. Okay. Describe the range for us.

A. The range is anywhere between -- anywhere between 3.2 feet into the travel lane up to about -- I think that's 6. Let me double-check. 5, I'm sorry. 5 feet to the travel lane. So anywhere between 3 and 5 feet.

Q. In the travel lane or outboard of the Toyota?

A. Into the travel lane.

Q. Okay. And -- but you don't have an opinion about how far back he was from the Toyota?

A. I modeled him a couple feet. But again, you know, plus or minus 5 feet. There's no reason to take a hard stance on that, because it doesn't affect any of the analysis.

Q. Okay.

A. Certainly, if it was 250 feet, that would affect things. But that variable is not that sensitive.

Q. But then, so if I ask you to draw an X marks the dot where Nehemias Santos was standing when he was struck by Caylee Smith, you cannot draw that X?

A. Well, remember, I'm giving you a range, so I would have to draw a series of X's --
Q. Right, right.
A. -- within that range.
Q. But you can't -- but you can't draw one X and say that's where he was standing?
A. No, no. I'm giving you a range, so I can't -- I can't establish a range with one point.
Q. Okay. So if you go to Figure 121 on Page 180 -- let me know when you're there.
A. Okay.
Q. All right. So you see where you've got an arrow pointing to his body, it says "initial rest"?
A. Yes.
Q. Okay. So how did you conclude that his feet were in the middle lane as opposed to his feet being pointed towards the Toyota?
A. Yeah, that certainly has room for -- oops -- that is not drawn specifically. What the evidence shows is that he was dragged.
Q. So your opinion is his head was at the point where y'all drew the head on Figure 121, right?
A. In his initial rest?
Q. In his initial rest, yes.
A. That seems to be where the blood is coming

from, so it just makes the most sense, especially with him being dragged backward towards the shoulder. It's just what made the most sense.

Q. But you don't have an opinion about which direction his legs were facing, either towards the Toyota or towards the middle lane?

A. No. And I indicated that in the report. I don't have a specific final rest, or I should say initial rest of him. I just know it was on the initial path of the travel lane.

Q. So if Figure 121 was replicated, but with his head where it is in the initial rest position, but his feet pointing towards the Toyota, you wouldn't have any problem with that?

A. No.

MR. WHITE: Okay. All right. I reserve the rest of my questions for trial.

MR. DUBOFF: Okay. Let me just -- I just have a couple.

CROSS-EXAMINATION

BY MR. DUBOFF:

Q. I think that this might have just been a word mix-up, but, Mr. Montalbano, correct me if I'm wrong. This was earlier in your testimony. But do you recall Mr. White asking you questions about how average drivers

have responded to roadside obstacles?
A. I think so.
Q. And I think there was a phrasing for a few of the questions that was something like, "So people slow down a few miles per hour before they hit a pedestrian." Can you just -- are those studies that you were referencing, were those about pedestrian strikes or about roadside obstacles or both?
A. Oh, I -- did I say "before hitting the pedestrian"?
Q. I think the question was phrased in that way.
A. Oh, yes. So these were roadside hazards that weren't imminent hazards. It was determining what drivers did in response to the presence of a potential hazard. And the studies show that drivers typically will slow down 1 to 3 miles per hour for a roadside hazard prior to crossing that roadside hazard, so prior to arriving at the roadside hazard.
Q. Okay. And so those studies were not about how far before hitting a pedestrian people brake?
A. No, those were not imminent hazard studies. Those were potential hazard studies, which is what we have in this particular case.
Q. With regard to -- if you could turn to Page 61 of your report in Figure 83.

A. Okay.

Q. And this is going back to the questions that you were asked about whether one of those tire marks was made by somebody driving through that fluid. Is it your understanding that those photos were taken when Mr. Santos was at his final point of rest?

A. Yes.

Q. And in the course of your analysis, did you review all of the body camera and dash camera video that was available?

A. Yes.

Q. During any of that video, did you see a car -- well, let me back up.

No one -- a car could not have made those tire marks driving through the fluid when Mr. Santos was at his initial point of rest without driving over Mr. Santos, correct?

A. Yeah, I would agree with that. In particular in this picture, we see some brain matter also in line with that tire track, so I would imagine the brain matter would have been flattened in conjunction with driving over the fluid if this was post impact.

Q. And so for -- for a tire to have driven through the fluid, it would have had to have been after Mr. Santos's body was dragged onto the shoulder, correct?

A. Right.

Q. Did you see anything in any of the video that you reviewed that would indicate that a vehicle did drive through the fluid?

A. No.

Q. And did that -- does that contribute in any way to your opinion that those are actual tire marks from an -- from an emergency maneuver as opposed to driving through fluid?

A. Yeah. I mean, I think it goes back to the consistency of the curvature of the marks, and the characteristics of the marks tell me that it has all of the classic details of a swerving maneuver versus traveling through some fluid. And then, obviously, when you factor in the other components that would have had to have been driven over if that was a post impact, I think that certainly compounds [sic] to my interpretation of the characteristics of those marks as swerving marks prior to.

Q. With regard to the questions about GPS precision, just to try to maybe put it in simpler terms, I suppose it's true that every point on the Earth has a true GPS location?

A. Yes.

Q. Okay. And so when we're talking about --

when you use the phrase "global accuracy," tell me if this is what you mean by that. If I were to go out to a point in the middle of the woods, get my true GPS location, and, like, plant a flag there, would accuracy be the ability of a GPS device to locate that exact spot?

A. Yes.

Q. Okay. And that -- that has a certain tolerance or error factor to it?

A. Right.

Q. Okay. When you were speaking about relativity and things of that nature, am I understanding correctly that wherever Ms. Smith was on the globe, you would expect the GPS data to pick up if, from one second to another, she was moving east or west or north or south?

A. Yeah. When you're in the same environment, when you take that sample of your GPS data into very small increments -- where we're not talking differences between having 24 satellites in your reception versus 22 satellites -- a couple miles away, either due to the position of the satellites and the differential distance on the Earth, you're talking about a very small subsample where all the points in that subsample are going to have the same satellite numbers. It's going to have the same signal, or reception, you can say, to those satellites.

The things that really affect GPS signal is, again, number of satellites that you have available to you depending on the constellations, what path they're in, the reception to those satellites: Are there buildings or trees obstructing the reception or interfering with the reception where the signal could bounce off of objects and cause some errors? Those are really the big factors that affect your accuracy.

So when you take a small subsample that has the same environment and variables that go into accuracy, the accuracy is the same on every subsample. And so any deviation between subsamples is going to be accurate. I like to call it the theory of relativity.

Q. Under -- understood.

You used a phrase towards the end, and I just want to make sure we're clear on that. Towards the end of your testimony, you spoke about comparing Plaintiffs' version of events to the defense version of events; is that right?

A. Right.

Q. And just so we're clear, when you use those terms, the defendants' version of events is Ms. Smith is driving sort of as far right in the left lane as she can without intruding into the middle lane?

A. Correct. Like, she scooted over in the right

lane, similar to what the human factor studies show drivers do in response to a roadside potential hazard like a vehicle with a pedestrian.

Q. And you understood from Ms. Moreno's statements to police at the scene where she said that Mr. Santos never went further into the lane than the Camry, correct?

A. Correct. I think she was confused at how it happened, since she didn't see him go into the lane.

Q. Is it fair to say that the range of values that you calculated were sort of based on what the evidence shows the minimum and maximum distances that Mr. Santos could have been laterally in the left lane?

A. It was a fully encompassing range accounting for both versions. At the end of the day, it's -- it is -- there's no smoking gun evidence to tell us where within that range this happened. What I can say is the range closer to Defendants' version does make more sense based on Mr. Nehemias's final rest versus Plaintiffs' version.

But what I can objectively say is these are the two versions that were provided to me. When you factor in the overlap established from the damage matching, this is the range that it lies within. I'll let the jury decide what side of the range or what end of

the range or whether they want to pick the middle of the range where they think he was standing, but it's going to be somewhere in that range, based on what I've been provided.

Q. And just -- can you explain what you mean by "Plaintiffs' version of events"?

A. Plaintiffs' version was that she, being Caylee, drove onto the shoulder and made an emergency swerve from the shoulder to her right, striking Mr. Nehemias, which we know she didn't strike the Toyota, and we know the vehicle dynamic properties of an emergency swerve. And that emergency swerve would have had to start 250 feet away in order for her to displace herself laterally from the shoulder and not strike the Toyota.

And so I think that number is valuable to the jury, because when they're listening about the testimony of these witnesses that observed her on the shoulder, my understanding was they looked up at impact. And I did not hear anybody testify that she was 250 feet away when she was on the shoulder, because it's physically impossible for her to exist on the shoulder any closer than 250 feet away, because she cannot get out of the way in time or she would have ran into the Toyota, and we know she did not run into the Toyota.

So I know on a vehicle dynamics standpoint, she cannot exist on the shoulder any closer than 250 feet. So if she ever did exist on the shoulder, it was beyond 250 feet away, and again, we don't have any corroborative digital evidence to indicate that based on her GPS coordinates and her bearing data.

Q. And I think just to clarify, there have been several versions from Plaintiffs or witnesses on the Plaintiffs' side, one of which is that she actually hit Mr. Santos when he was standing fully on the shoulder?

A. Right, which is physically impossible.

Q. Okay. So that's not included in your range of his possible locations, correct?

A. Not at all. That was physically impossible.

Q. Okay. So when you say you took into account Plaintiffs' version, you had to in some way align Plaintiffs' version with what would be physically possible?

A. Right. What I did was I took the testimony that she was on the shoulder and aligned it with the fact that she did not hit the Toyota and tried to give them the Plaintiffs' version as much as I could.

MR. DUBOFF: Okay. Those are all the questions that I have.

MR. WHITE: Reserve the remainder for trial.

THE VIDEOGRAPHER: Two questions before we go off: Would you like the video, to order the video at this time?

MR. WHITE: Yes, please.

THE VIDEOGRAPHER: Would you like it synced with the transcript?

MR. WHITE: Yes.

THE VIDEOGRAPHER: Would you?

MR. DUBOFF: Yes, ma'am.

THE VIDEOGRAPHER: The time is 3:19 p.m., and we are off record.

THE REPORTER: So you're ordering the original; standard turnaround time?

MR. WHITE: Yes, ma'am.

(The deposition was concluded at 3:19 p.m.)

CERTIFICATE OF OATH

STATE OF FLORIDA:
COUNTY OF ORANGE:

I, Jennifer Prohaska, Stenograph Shorthand Reporter, certify that PAUL J. MONTALBANO personally appeared before me and was duly sworn.

WITNESS my hand and official seal this 19th day of December, 2023.

Jennifer Prohaska

____
Jennifer Prohaska
Notary Public - State of Florida
My commission No.: GG987188

CERTIFICATE OF REPORTER

STATE OF FLORIDA:
COUNTY OF ORANGE:

I, Jennifer Prohaska, Stenograph Shorthand Reporter, certify that I was authorized to and did stenographically report the foregoing deposition of PAUL J. MONTALBANO; that the review of the transcript was requested; and that the foregoing Pages 4 through 217, inclusive, are a true and complete record of my stenograph notes.

I further certify that I am not a relative or employee of any of the parties, nor am I a relative or counsel connected with the parties' attorneys or counsel connected with the action, nor am I financially interested in the outcome of the action.

DATED this 2nd day of January, 2024.

Jennifer Prohaska

____
Jennifer Prohaska,
Stenograph Shorthand Reporter

ERRATA SHEET
DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES

IN RE: Erick Roderico Pivaral Gonzalez, Individually and as Special Administrator of the Estate of Nehemias R. Pivaral Santos, Deceased, Erick Santos, and Evelyn Moreno vs. Caylee Erin Smith & Eastman Chemical Company

CASE NO.: 3:22-CV-02714-K

DATE: December 19, 2023

DEPONENT: PAUL J. MONTALBANO

PAGE # LINE # CORRECTION REASON

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Under penalties of perjury, I have read my deposition in this matter and that it is true and correct, subject to any changes in form or substance as reflected above.

Dated:______________Signed:__________________

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January 04, 2024

Paul J. Montalbano

RE: Deposition of **Paul J. Montalbano** taken on 12/19/2023
Erick Roderico Pivaral Gonzalez v. Smith & Eastman Chemical Company

Dear ,

IMPORTANT NOTICE FOR DEPOSITION TRANSCRIPT READ AND SIGN

It is suggested that the review of this transcript be completed within 30 days of your receipt of this letter, as considered reasonable under Federal Rules*.

_X_ **Attorney - Copy of Transcript Enclosed:** Signature of the Deponent is required. Please have the deponent make any corrections/changes necessary on the Errata Sheet ONLY, sign name on the form where indicated. Please return ONLY the original signed Errata Sheet to our offices within 30 days from the date of this memorandum. If you have any questions, please call our offices.

___ **Attorney - No Copy Ordered:** Since you did not request a copy of the transcript, it will be necessary for the Deponent to call our offices to arrange for an appointment to read and sign the transcript of the Deposition within 30 days of this memorandum.

___ **Deponent:** At the time of your deposition, you did not waive your right to read and sign the transcript of your testimony, therefore, attached please find a copy of the transcript and Errata Sheet. Please read the transcript, make any corrections necessary on the Errata Sheet ONLY, sign the bottom of the Errata Sheet, and return it within 30 days from the date of this memorandum. Please call our offices if you have any questions.

___ **Deponent:** At the time of your deposition, you did not waive your right to read and sign the transcript of your testimony, therefore, it is necessary for you to come to our offices to read and sign same. Please call Milestone Reporting Company to arrange for an appointment at your earliest convenience.

___ The attached executed copies of the Errata Sheet(s) are sent to you for your files. If you have any questions, please call our offices.

Thank you for your attention to this matter.

No. 300977

cc:

Waiver:
I, Paul J. Montalbano, hereby waive the reading and signing of my deposition transcript.

______________________________________ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Deponent Signature Date

*Federal Civil Procedure Rule 30 (e) / Florida Civil Procedure Role 1.310 (e)

EXHIBIT C

Figure 70: Ford damage.

EXHIBIT D

ORIGINAL
TRANSCRIPT

UNITED STATES DISTRICT COURT

FOR THE

NORTHERN DISTRICT OF TEXAS

Erick Roderico Privaral Gonzalez, et al.)	
Plaintiff,)	Civil Action No.:
v.)	3:22-CV-02714-K
Caylee Erin Smith & Eastman Chemical Company,)	
Defendant.)	

DATE: December 14, 2023
Kingston, New York
TIME: 11:31 a.m.-1:33 p.m.

Jaiden Hernandez, Reporter

DEPOSITION

OF

IRIS DALLEY GRAFF

(Appearing on behalf of the Defendants)

APPEARANCES:

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STIPULATIONS

IT IS HEREBY STIPULATED AND AGREED by and between the attorneys for the respective parties hereto, that the sealing and filing of the witness' deposition are hereby waived.

IT IS FURTHER STIPULATED AND AGREED by and between the attorneys for the respective parties hereto that all objections, except as to the form of the question, are reserved to the time of trial.

IT IS FURTHER STIPULATED AND AGREED by and between the attorneys for the respective parties hereto that they may sign this deposition before any duly qualified Notary Public.

* * * * *

Dalley Graff

* * * * *

Iris Dalley Graff, a appearing on behalf of the Defendants herein, having been first duly sworn by a Notary Public within and for the State of New York, was examined and testified as follows:

* * * * *

MR. WHITE: This is Jacob White, counsel for plaintiff Nehemias Santos, the Estate of Nehemias Santos, his father Erick Gonzalez, his brother Erick Santos, and Evelyn Moreno.

We're here for a deposition on December 14, 2023. We're starting at approximately 11:32 a.m. Eastern Time, and I understand we've got a 1:00 p.m. hard stop; is that correct?

MR. BUNT: Yes.

MR. WHITE: And in the room with us are Brian Bunt, counsel for --

MR. BUNT: I'll just -- I'm Brian Bunt, counsel for Defendants Eastman Chemical Company and Caylee Erin Smith. Also present is my paralegal Stacy Bunt.

And I'm just going to state for

purposes of the record, not throwing stones, the deposition was scheduled to begin at 9:00 a.m., and so we're starting very late.

MR. WHITE: Correct. Correct. No objection from me there.

Q All right could you, the deponent, state your name for the record.

A Iris Dalley Graff.

Q And are you a Dr. Graff? I just want to make sure I address you correctly. Is Ms. Graff, Mrs. Graff or Iris, or what do you prefer?

A I'm not a doctor.

Q Okay. Is it okay if I call you Iris, or do you prefer Mrs. Graff?

A Iris is fine.

Q Okay. Perfect, perfect. I take it you've been deposed before.

A I have.

Q Okay. So there's normally an initial litany of statements and agreements I would read for you, but in the -- due to the exigencies of time, I'm going to not do most of those. But I do want to ask that you agree that if I ask you a

Dalley Graff

question and you answer it, you agree that means that you understand the question. Do you agree with that?

A Could you restate that, please?

Q Sure. If I ask you a question and you answer it, can you agree that that means that you understood the question?

A That I'll only answer questions that I understand.

Q Okay. That's fine. That's perfect. If you don't understand a question I ask, just let me know; okay?

A Okay.

MR. WHITE: So let's introduce a couple of exhibits. We'll mark these as Exhibits 1, 2, and 3.

Let's mark your report in this case as Plaintiff's Exhibit 1. You already have a copy. Let's mark your CV as Plaintiff's Exhibit 2. And the list of cases that you have testified in in the past, I believe, five years as Plaintiff's Exhibit 3.

(SCENE RECONSTRUCTION REPORT, BATES-STAMPED 00476.118002323 to 68 RECEIVED AND MARKED AS PLAINTIFF'S

Dalley Graff

EXHIBIT 1 FOR IDENTIFICATION.)

(CURRICULUM VITAE OF IRIS DALLEY GRAFF, BATES-STAMPED 00476.118002313 to 21 RECEIVED AND MARKED AS PLAINTIFF'S EXHIBIT 2 FOR IDENTIFICATION.)

(SPREADSHEET OF CASES, BATES-STAMPED 00476.118002322 RECEIVED AND MARKED AS PLAINTIFF'S EXHIBIT 3 FOR IDENTIFICATION.)

BY MR. WHITE:

Q Do you recognize these exhibits?

A I -- I recognize what appears to be a copy my CV, and I recognize what appears to be a copy of my report with an attachment of separately printed figures from the report.

Q Okay.

A I have not before seen the spreadsheet listing these cases.

Q Well, take a look at that list of cases. Does that appear to be correct and complete?

A I do recall testifying in each of the listed cases.

Q Have you testified in any other cases that are not listed on this list since February of 2018?

Dalley Graff

A Not that I recall at the moment.

Q Okay. And just to confirm, all of these are criminal matters that are listed on Exhibit 3?

A There's one that I'm not certain if it falls under a criminal or not.

Q And is that the row where -- in column C, where it says it was a grand jury?

A Yes.

Q I take it Madison County vs Dreasjon Reed, you were testifying in front of a grand jury; is that right?

A Yes.

Q Okay. And just for the record, I think that probably means it was leading to a criminal indictment, but do you know otherwise?

A I know there was not a criminal indictment.

Q There wasn't one issued in that case?

A That's correct.

Q Okay. Do you remember what your testimony was in that case?

A Yes.

Q Can you describe it for me?

Dalley Graff

A It was an officer-involved shooting.

Q Okay. And were you testifying on -- did the prosecutor call you as a blood spatter or a blood pattern analyst?

A I think I was actually contacted originally by the Indiana State Police, but that was -- I don't know if they were speaking on behalf of the prosecutor. I don't know what their relationship was.

Q Okay. So did any of these cases that are listed here involve a pedestrian struck by an automobile?

A No.

Q Okay. How many of the cases listed here involved shootings with a firearm?

A Seven.

Q Okay. Which ones did not involve a shooting with a fireman?

A US vs Tyler Mullins.

Q And what did that case involve?

A It was a death investigation.

Q Okay. How was the death caused to the best of your knowledge?

A It was a multitude of injuries.

Dalley Graff

Q Do you know what the cause of those injuries were?

A There was blunt force trauma. There was exposure to carbon monoxide. There was shooting. That was affixation.

Q So Tyler Mollins, that case did involve the use of a firearm as a potential contributing cause to death?

A I think it was. I don't recall if it was listed as the primary cause of death, but it would have been one of the primary causes.

Q Do you know what the causes of the blunt force trauma were in that case?

A I don't know specifically. I know generally what was presented as potential weapons.

Q Okay. And so can you summarize for us your conclusions in that case? The Tyler Mollin's case.

A The conclusions involved the clandestine burial and acts that had to have occurred prior to that clandestine burial and the sequencing of those acts.

Q And did you -- so I see here that that case is marked "Subject Matter, Crime Scene

Reconstruction." Did you not conduct a bloodstain pattern analysis on the case?

A Bloodstain pattern analysis was a part of the crime scene reconstruction.

Q Okay. And what were your conclusions from your bloodstain pattern analysis in that case?

A In that case that the blunt force trauma occurred at a different location and involved a vehicle and the sequencing of events at the gravesite.

Q So a vehicle was involved in that case?

A Yes, it was.

Q Okay. Can you describe your conclusions regarding how a vehicle was involved in that case?

A That the victim was concealed and contained within the trunk of the car while the car was in motion, while the engine was running.

Q And how did you reach that conclusion?

A Carbon monoxide in her blood and bloodstains inside the vehicle.

Q Okay. Now, are you an expert on what's in someone's bloodstream, or are you just a

Dalley Graff

blood pattern analyst expert?

A I do crime scene reconstruction, which means I can use the conclusions of other experts, such as toxicologists issuing a report.

Q So in that case did you rely on a toxicology report?

A I did.

Q Okay. Did you rely on a pathology report or an autopsy in that case?

A I did.

Q How many of the cases listed here did you rely on another technical expert's report, such as a pathologist or a coroner or some other forensic analyst?

A I'm sorry. I don't think it would be correct to say that I relied on the report, but they provided information that I used in conjunction with my analysis.

Q Okay. So, but, for example, if you're trying to figure out what's in someone's bloodstream, you have got to get that information from a different forensic expert; correct?

A If it's a toxicology, then, yes, it would have to be done by someone who does

Dalley Graff

toxicology or...

Q And why wouldn't it be done by you?

A I'm not a toxicologist.

Q Okay. Which means you can't run toxicology reports, correct?

A That's correct.

Q All right. You can't conduct autopsies, correct?

A I don't personally do the autopsies. I have attended autopsies. I've provided information to the person doing the autopsies, have discussed results of the autopsies in context of the scene in which it occurred, but I don't do the autopsy itself.

Q And you can't sign an autopsy report, right?

A That's correct. I don't sign an autopsy report.

Q Okay. So in -- did -- you've already testified that US vs Tyler Mullin's case did not involve a shooting, right, as a primary cause of death. Are there any other cases on there that didn't involve shooting as a primary cause of death?

Dalley Graff

A Okay. I think you misstated what I said --

Q Okay.

A -- that, in fact, in the U.S. v. Tyler Mollins, I believe that the autopsy did list gunshot wound as a prime causes of death.

Q Okay.

A But these other injuries were also involved in leading to the death.

Q Okay. So then I guess I misunderstood earlier, because I thought you said US vs Tyler Mullins did not involve a firearm shooting.

Are there any cases on this list that's Exhibit 3 that do not involve a firearm or an injury caused by a firearm?

A I'm sorry. I misstated earlier. I believe they all involve some firearm at some point.

Q Okay. Do any of these cases on Exhibit 3 involve blunt force trauma caused by a moving vehicle?

A Well, as I said in the US vs Tyler Mullins case, there was blunt force trauma. And I don't know the exact tools or implements that were

used. I don't have direct evidence that they were caused by a moving vehicle.

Q Fair enough. But, again, my question was: do any of these cases that are on Exhibit 3 -- to your knowledge, do any of them involve blunt force trauma caused by a moving automobile?

A With the possible exception of the car being used in the unidentified weapons of the blunt force trauma in that one case, none of the others that I know of involve moving vehicles at the time of death.

Q So how many cases -- not just the ones listed on Exhibit 3 -- how many cases have you participated in an investigation of that have involved blunt force trauma caused by a moving vehicle?

A Several. I don't have a number.

Q Can you, I mean, give us your best guess?

A I really don't have a number.

Q Is it less than a dozen? More than a dozen?

A It would just be a guess that's around a dozen, but that's just a guess.

Dalley Graff

Q So it could be less than a dozen? It could be more than a dozen?

A Could be. I don't recall.

Q Okay. Do you remember the last time when you investigated a case that involved blunt force trauma caused by a vehicle?

A I do not remember the last one. The last one before this one?

Q Sure.

A I only have this one at the present.

Q Okay.

A But I've been in a number over the years.

Q Okay. Do you think, before this case, the last one was in the last decade?

A I would say probably yes, but I don't specifically recall one -- any one particular case at the moment.

Q Okay. Have you ever dealt with a case -- have you ever worked on a case involving a pedestrian struck by a motor vehicle going over 70 miles an hour?

A Well, I have worked on cases that involved pedestrians hit by a vehicle. I don't

know the speed.

Q Okay. Can you describe the cases where you did work on -- strike that.

Can you describe cases that you worked on that involved a pedestrian struck by a motor vehicle?

A I'm sorry. You want -- could you restate that question? I don't understand the question.

Q Sure, sure. Can you describe the facts in this cases that you have worked on that involved a pedestrian struck by a motor vehicle?

A I -- couple of them come to mind. Of course there's been a lot of cases over the years. But one was a teenage girl walking on the road, and a car struck her, and that was a hit-and-run. There was a -- a young man walking on the side of the road hit by a pickup. There have been several where people were apparently laying on the roadway and run over. There was an RV where a man said that his wife got out to urinate behind the vehicle and said he went to turn around and accidentally ran over her. There was a case of an apparently romantic relationship gone bad where he actually

said that he took her out there and ran over her multiple times on a road.

Q So in any of the cases that you just listed, did any of those cases involve someone struck while -- strike that.

Did any of the cases that you just listed involve an impact between a motor vehicle and a pedestrian on an interstate highway?

A I don't recall the roadways.

Q Okay. So let's talk about the first one that you mentioned, a hit-and-run. Do you remember how you conducted your analysis in the hit-and-run case where a teenage girl was involved in a hit-and-run?

A Yes. I looked at, for one thing, the car when it was found. And I examined the car to determine, if possible, whether or not this was, in fact, the same car because it was a hit-and-run. But I would have also looked at the autopsy results, the clothing worn by the victim, and those kind of things.

Q So in that case did you physically -- like you in person examined the car that was involved in the hit-and-run?

Dalley Graff

A I did.

Q Did you physically review the body, or did you just review the autopsy afterwards?

A I don't recall if that was one of the cases that I went to the autopsy or not.

Q Okay. Did any of the cases that you told me about involving a pedestrian and a motor vehicle, did you review the vehicle involved physically in each one of those cases?

A Most of them I did, but without going through case by case, I'd have to look at my notes for exactly what I did in each case.

Q Okay. Did -- well, why -- is it preferred to do a scene visit or to review the evidence in person as a blood pattern analyst?

A It really depends on what the evidence is. Sometimes that can be done from the documentation done at the scene. Sometimes being at the scene is helpful. It doesn't change what is documented.

Q Okay. What sort of documentation would allow you to conduct an investigation without seeing the scene or the vehicle in person?

A What was the first part of your

question?

Q What sort of documentation would you like to have in order for you to conclude that it's not necessary for you to visit the scene or, for example, see the vehicle in person?

A Well, in doing the analysis, I want to see things like images, whether they're still images or video-recorded images. If a sketch or drawing is done by someone on the scene, then I would want to see that. Any descriptions that are given. Any reports -- especially official reports, autopsy reports, or medical reports, if the person is not dead. All of those things can contribute. So the more information that I have, the more detailed the reconstruction can be.

Q Okay. So when you're doing a blood pattern analysis -- and am I saying that correctly? I know there's different phraseology. Some people call it blood spatter analysis. I take it you call it bloodstain pattern analysis; is that right?

A It's bloodstain pattern analysis.

Q Okay. So when you're conducting a bloodstain pattern analysis, are there any reports or information that are necessarily required in

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order for you to do your investigation without visiting a scene or seeing evidence in person?

A The extent of the analysis -- and the bloodstain pattern analysis is just one part of the overall reconstruction. So the better the documentation, the more specific, the more detailed information that can be included in the reconstruction. So the analysis is limited by the availability of the evidence.

Q I guess what I'm asking is: is there a minimum threshold at which if the evidence that you have is not above that minimum threshold where you cannot conduct a bloodstain pattern analysis?

A But in doing the bloodstain pattern analysis, I will see what is available and, again, that will determine how far the analysis will go.

If all I -- for example, if there's only one bloodstain by itself, one bloodstain by itself does not make a pattern and doesn't -- is not alone something that can identify the action, other than the fact that there was blood shed.

Q So how do you conclude that blood has been shed from photographs?

A If the blood is outside of the body,

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then there has to have been bloodshed, because the blood is made inside the body.

Q Okay. So how do you know that what you're looking at is blood?

A I do that based on my own education, training, and experience and the number of years that I actually attended scenes looking at blood.

Q Okay. So I want to ask you about that. Can you summarize your education for us?

A My education is that I have a bachelor's in science and biology. I have a master's in secondary sciences. I have a --

Q Let's -- what is a master's in secondary sciences?

A It's a graduate degree specifically for teaching in the areas of science. And I specifically taught in the physical sciences, biology, general physical science, botany, anatomy, physiology, all of that was included -- zoology.

Q Where did you teach those topics?

A I taught in primarily -- McAlester High School was the longest. But I also taught as an adjunct to local colleges.

Q Which local colleges did you teach at?

Dalley Graff

A It would be -- I forgot the name of the college. It's in Wilburton, Oklahoma.

Q Okay.

A As an adjunct there. I think I also taught some for the East Central University of Ada. It's been a number of years ago.

Q But you said primarily you taught these science topic at McAlester High School?

A Correct. Yeah. I taught -- the first year I taught math, and then I taught general physical science. And I taught physics one year and then advanced placement biology, which was a course where they could get more the credit than in the other science courses.

Q And which grades did you teach in McAlester High School?

A 9 through 12. But primarily the high school juniors and seniors for the most part.

Q And how long did you teach at McAlester High School?

A It was eight or nine years. I don't recall exactly.

Q Do you remember just -- and it's not a trick question but -- the time frame? Like, what

years to which years? It's okay if you don't know exactly.

A I left that position in -- I think it was '88.

Q So maybe approximately from '78 or -- excuse me. From 1980 to 1988?

A Approximately.

Q And what has your -- what's your professional experience been since you taught at McAlester High School?

A In 1989, I joined the Oklahoma State Bureau of Investigation, and I attended thousands of hours of training through my career; and I worked primarily in forensic biology, forensic zoology. And I also did crime scene investigation throughout my career.

Q Okay. So do you have a degree in engineering?

A No, I do not.

Q Okay. Do you have a degree in physics?

A No, I do not.

Q Okay. What engineering training have you received?

Dalley Graff

A I received some training in engineering back when I was studying physics, but I did not major or minor in engineering.

Q So you mean you took just maybe some college classes on engineering?

A It was included in the physics courses.

Q Okay. So did you study fluid dynamics at any point in your professional training?

A Yes.

Q Do you have a degree in fluid dynamics?

A No, I do not have a degree specific to fluid dynamics.

Q Okay. Do you consider yourself an expert in fluid dynamics?

A Only as it relates to bloodstains and how bloodstains are formed.

Q Okay. So you have a particular expertise in blood fluid dynamics. Do I understand you correctly?

A I have some general training in fluid dynamics, which I attended a workshop in 2016, 2017. I don't remember which year. It was

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presented by Mark Germaine [proper noun subject to change] from the University of Otogo in the South Island of New Zealand.

Q New Zealand is great.

A Yes. I did some teaching there myself for a couple of years.

Q In Dunedin I take it?

A Yes, in Dunedin.

Q So is that the extent of your fluid dynamics training is the workshop in New Zealand?

A No. The workshop actually was presented at the gendarmarie headquarters just outside Paris, France, but it was focused on fluid dynamics and particularly as it relates to the formation of bloodstain patterns.

Q Well, you said earlier you do have some general training in fluid dynamics. I'm trying to figure what's the extent of your understanding of fluid dynamics separate from your understanding with fluid dynamics with relation to blood. So setting aside your understanding of fluid dynamics with relation to blood, what is your general understanding of fluid dynamics?

A Well, in terms of formal education,

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there were units in fluid dynamics included in the physics courses in college, and then I studied the formation of bloodstains through various texts over the years and doing my own experiments through the years and then eventually attending Mark Germanine's class.

Q How do you determine the viscosity of a fluid?

A I haven't done this in a number of years. I'm trying to remember the name of the device. I worked for a couple years at a food processing plant where I had to determine the viscosity of several of the products there. I remember doing it. You check specific gravity and things like that. I don't recall now. I do recall making reports about the viscosity of a number of liquids.

Q So you have some experience determining the viscosity of fluids, but I understand your testimony is that you did that at a food processing facility, and you had some machine that helped you do that?

A I had various tools at the time. The tools at the time were much more primitive than the

electronics that we use today.

Q Okay.

A But at that time, I did it on a daily basis, and it would be very simple to -- to name those implements, but that has been a number of years ago.

Q Okay. So it's been some time since you determined the viscosity of a fluid?

A Since I personally measured the viscosity of a fluid has been a number of years.

Q Okay. Do you think you could determine the viscosity of a fluid from a photo of a fluid?

A It would depend on the fluid.

Q Can you?

A Well, there are certain types of fluid, if you kind of know what it is, then you can look it up. There are certain limits, and blood would be an example.

Q But you would have to know what the fluid was before you could determine the viscosity from the photo, right?

A Well, I don't determine viscosity as such from a photo, but I look at viscosity in terms

of the physical characteristics, as part of the physical characteristics of blood that helps to determine how the bloodstain patterns were formed.

Q But you would have to know it was blood before you could determine the viscosity, correct?

A I don't have to determine the viscosity to see what the patterns are, but I use the explanation of viscosity to help explain how the patterns are formed.

Q So if you know it's blood, you understand it's viscosity, and then you can therefore determine the bloodstain pattern analysis. Do I understand you correctly?

A No.

Q Okay. Please correct me.

A When we look at bloodstain patterns, one of the considerations that helps to explain how patterns are formed is the viscosity of blood. We also know that blood has adhesive and cohesive properties that help to explain how blood moves, how blood collects, how bloodstain patterns are actually formed. I don't need to know the numbers to know this. Here's the physical effect.

Dalley Graff

Q Sure, sure. Because you already know the viscosity of blood; right?

A We know how the viscosity of blood effects the formation of the patterns. I don't have to know the exact number.

Q Sure. I guess what I'm wondering is: as a prerequisite to determining what you understand from a bloodstain pattern, you have to know you're looking at blood; right?

A If I'm looking at a pattern, I can determine the pattern without knowing the viscosity, and I can look at patterns and because blood is a fluid, it acts as other fluids. So if there is some other fluid with a similar viscosity, it will form generally the same kinds of patterns. I don't rely just on viscosity to determine whether or not I think the fluid is blood.

Q So do you think all fluids have the same viscosity?

A I know they are not.

Q Okay. So my question is: if you're looking at a pattern, right, do you need to know that it was caused by blood -- Excuse me. Sorry. Strike that.

If you're looking at a pattern on a photo, before you do the bloodstain pattern analysis, you need to know you're looking at a pattern created by blood, right?

A If I look at a photo of a pattern, I can see that there's a pattern, period, full stop. If you look at everything together, I can make judgments about whether or not this looks to me like blood based on my experience.

Q And if it wasn't blood, would your pattern analysis be the same; or are you qualified to do a pattern analysis on fluids that are not blood?

A I could still describe what I see in a pattern as far as identifying it's characteristics, what's the shape of individual stains within a pattern, what are the margins of that particular shape, if there's a movement of fluid within that shape, what that looks like. You could still describe the pattern.

Q But can you derive conclusions from a pattern of a fluid that is not blood?

A I'm not sure if I understand the question.

Dalley Graff

Q So the purpose of bloodstain pattern analysis is not just to identify patterns, right?

A The purpose of bloodstain pattern analysis is to try to determine -- based on the pattern that we see -- what movement of blood, what potential causes, what forces may have been acting to result in the final pattern.

Q Perfect. So the purpose of bloodstain pattern analysis is not just to say this is an impact pattern. It is to say what caused the impact pattern, correct? For example --

A The purpose of reconstruction using bloodstain pattern analysis is to identify actions that occurred. So you don't use just the pattern by itself to identify any other or specific actions that occurred.

Q But because you are an expert in the fluid dynamics of blood, according to you, you are able to determine the causes of bloodstain patterns, right, by looking at the patterns? That's your expertise?

A It's looking at the patterns in the context of the scene. Identifying what are possible sources within the context of the scene.

Dalley Graff

Excluding what's not possible within the context of the scene.

Q Okay. But you have a particular expertise on how blood, for example, flies through the air; right?

A I do know how blood travels through the air.

Q Okay. Do you know how, as compared to blood, brain tissue flies through the air?

A I do.

Q Okay. So what is -- let's stick with blood for a second. What experiments have you conducted in a controlled environment to confirm how blood travel throughs the air?

A I've done a number of experiments through the years since we teach bloodstain pattern analysis and do these repeatedly.

Q Can you describe those experiments?

A Well, we do a number of them beginning with simple blood falling to capture images of blood as it falls, particularly when we have had the advantage of having the equipment available.

When we were in France, we did high speed photography so that you can see it from the

Dalley Graff

very beginning as the drop forms and as it falls and the resulting pattern.

Q Okay.

A And I have looked at the work that other people have produced looking at those high speed to look at what happens as blood drops form, what happens when they impact a surface. We look at what happens when you have different surfaces.

Q So did you cite any of those experiments that you either conducted or reviewed in your report?

A I didn't list training materials or training exercises or specific experiments in the report.

Q Have you ever published any papers regarding the experiments you conducted about how blood flies through the air and how bloodstain patterns are created?

A Not outside the training materials that I make for my classes.

Q Okay. So have any of the training materials that you've presented to your classes, have they been peer reviewed by any scientific journals?

Dalley Graff

A I did not submit them to a scientific journal.

Q Have you ever submitted anything to a scientific journal?

A I think the only one was one for a Association for Crime Scene Reconstruction.

Q Okay. What was the topic of that paper?

A That was a reconstruction of a death investigation.

Q And was that paper published?

A It was published in the journal for that professional organization.

Q Okay. But have you ever conducted an experiment determining the cause of particular bloodstain patterns and published the results of that experiment in a peer-reviewed scientific journal?

A First, I've done numerous experiments to determine the cause of a particular pattern and what forces may or may not be applied to that. I have not published, other than the ones stated, in a scientific journal.

Q Why do you think peer reviewing a

scientific journal is important, or do you not think it's important?

A Well, I think you're asking two different questions. Do I think peer review is important, yes, I do.

Q I think my question is: for a scientific journal to get published -- to get published in a scientific journal, why do you think it's important that you peer reviewed before you get published in a scientific journal?

A Well, I think peer review is important. Whether or not it's published, peer review of the work is important.

Q Okay.

A And by extension if -- if you're pushing a theory to other scientists, there needs to be review whether before or after it's published.

Q Okay. And why is that important?

A Because we're looking at a scientific discipline and to try to be sure that we learn as much as we can, and primarily to make sure that we actually understand what is actually happening within the blood as the patterns form. And then as

Dalley Graff

we -- if you go into reconstruction, to be sure that your finding -- your conclusions are supported in the scientific principles and not to overstate or understate the conclusions.

Q And who peer reviewed your report in this case that is marked at Exhibit 1 in this deposition?

A In this case my husband did the review of the report.

Q And do you think it's appropriate to have your husband conduct a review of your bloodstain pattern analysis?

A I think it's important that I had someone who's certified as a bloodstain pattern analyst to review it.

Q Do you live with your husband?

A I do.

Q Do you guys share expenses?

A We do.

Q Okay. Did you ask anybody else that wasn't your husband to review your report in this case?

A I did not.

Q Okay. Why not?

Dalley Graff

A In part because we're, you know -- he's my business partner, and my business partner is reviewing my report.

Q Okay. So he has -- he shares in the profits from your bloodstain pattern analysis consultancy, correct?

A Well, I'm not sure I have a bloodstain pattern analysis consultancy. We occasionally work cases upon request.

Q But he's --

A But that's not the focus -- the main focus our business; so I'm not sure about that. The other thing is --

Q But he is your partner in that business?

A He is my partner in the business, correct.

Q You mean business partner as in sharing profits, right?

A I mean primarily business partners in that we do the work together, and that he has the qualifications for doing the review as opposed to going outside the company and hiring someone outside the company to do the review.

Dalley Graff

Q Okay. I'll ask the question directly: does your husband share in the profits of your consultancy?
A Yes.
Q Okay. All right. Do you know who Tom Bevel?
A Yes, I do.
Q Do you know who Ross Gardner is?
A Yes, I do.
Q Have you ever worked with them?
A I have.
Q Have you ever partnered with them?
A I was.
Q Okay. Are they considered authorities in the field of bloodstain pattern analysis?
A Some people may consider them authorities.
Q Do you?
A In some areas, I do.
Q Which areas did you consider them authorities in bloodstain pattern analysis?
A In those areas which they state things that are in agreement with the basic principles of the fluid dynamics of blood.

Dalley Graff

Q Have you ever published a criticism of their findings or any papers or textbooks that they have written?

A No.

Q Have you ever reviewed any papers or textbooks written by Tom Bevel or Ross Gardner?

A Yes, I have.

Q Are you in agreement with those documents or disagreement?

A I would have to see in context any particular portion. I agree with some of what is published, and I may not agree in some points.

Q Okay. Is there some third-party organization that would determine whether you're right or they're right if there's a point of disagreement, or is there not?

A Is there a -- there's not an adjudication body that says you're right and you're wrong. There's other scientists in the field that examine both sides and agree or disagree on various points or have different views.

Q Okay. So is there a credential for becoming a bloodstain pattern analyst, or can anyone become a bloodstain pattern analyst?

Dalley Graff

A I'm not sure what you mean by a "credential."

Q Well, let me ask it a different way. If someone holds themselves out as a bloodstain pattern analyst, is there any credential that they could get in trouble for not having if they were doing that work? For example, as a lawyer, if I got caught practicing law without a bar license, I get in trouble. Is there an equivalent sort of credential for bloodstain pattern analysts?

A There's not a bar as such, but I believe there are various bars in various states for attorneys; so you have to be on the bar of a certain state. There are various jurisdictions that hold different requirements for anyone doing any type of forensic analysis and particularly for presenting that in court and that varies for different jurisdictions.

Q But I guess my question is: is there any required credential for someone to hold themselves out as a bloodstain pattern analyst?

A Again, I'm not really sure what you're referring to as a credential. If someone...

Q You don't know what a credential is?

Dalley Graff

A I know what credentials are. If you're asking about a required credential, I don't know what is required. It varies in various jurisdictions. Some jurisdictions you simply -- someone can just present themselves as such and write a report, which may or may not be accepted by the Court. Others require a certain -- a certain level of degree before you're allowed to testify as an expert. So it varies in various jurisdictions.

Q I'm not asking about admissibility in court or credentials required for that. I'm asking are there credentials required by any bloodstain pattern analyst organizations that must -- that someone must have before they can issue an opinion on bloodstain patterns? Are you aware of any such credentials?

A There are various credentials that are -- that a person can get if they so choose, but generally you have to, if you're accepted as a bloodstain pattern analyst accepted by other analysts or by the Courts, which is typically where the -- the direction where those reports would go, that varies.

MR. WHITE: Okay. I object to the

nonresponsive answer.

Q So what are the techniques used in bloodstain pattern analysis?

A In bloodstain pattern analysis, you want to examine as much as possible the bloodstain. Look for the physical characteristics. Identify those, again, things like the size and shape of the overall pattern, size and shape of the individual bloodstains within the pattern.

Look for the margins of particular stains. Look for any variations across the pattern. Look for volume. You look at the surface that the bloodstain is on. Is it absorbent? Is it nonabsorbent? We look at -- if you're looking at something that is, for example, an impact spatter, what are the size and shape and the distance between individual stains? What's the destiny of the pattern? And if you're doing reconstruction, what within the context of the scene could provide the blood and any forces that would create those pattern.

Q So what are the models that predict how bloodstain patterns are created?

A I don't know what you mean by models

in that sense.

Q Well, I guess, do you have any scientific models that you use to predict how bloodstain patterns are created?

A Again, I don't know how you're using the word "models."

Q Was there any data that you used to predict how bloodstain patterns are created?

A I look at the physical characteristics that we know about blood. We look at how that -- how the patterns are formed. We actually do experiments ourselves. If I think a bloodstain could have happened this way, then I'd be sure that I have at some point tried to duplicate that and look at other possibilities.

In the context of the scene, is there another possibility that could create the same or similar pattern to see what can be excluded. Which things do I know could not have done this? See what -- what, in the context of the scene, could have contributed to this pattern.

Q So I guess my question -- and maybe if I give an analogy my question will make a little more sense.

A meteorologist has reams of data from the past that they have looked at or put into a computer, and they have certain models or algorithms that they have derived from the data, and that allows them to analyze present information and make predictions in the future.

So in your field of study, as sort of a meteorologist of bloodstains, what prior data do you look at when thinking about how the bloodstain you're looking at in a particular investigation was created?

A Well, metrology is quite different from fluid dynamics; so it's a little hard to draw that comparison.

Q You don't think meteorology involves fluid dynamics?

A Not the same way that we look at the blood as a fluid, if you I understand your use of the term meteorology.

Q So I guess my question is: what data do you look at to help create your analysis of a bloodstain that you're analyzing?

A Again, I look at the size, shape, margins, volume.

Dalley Graff

Q I'm not asking what you look at via the pattern that you're analyzing and doing an investigation. I'm asking about what prior data informs your analysis.

A Well, prior data would be those experiments that I have personally done with blood and how I know I personally produced patterns that look like this or that I have attended scenes where certain types of injuries will always produce certain types of patterns. How is this the same or different from all of those where I have something that gives me a known, if you will, for comparison? And compare that to what I see here, in addition to to this being blood and blood comes from the body from what I know about anatomy and physiology and what from that could result in the type of bloodstain patterns that I see.

Q So you just described your prior experiments that you personally conducted, right? That's one set of data that you use; is that right?

A That's correct.

Q And those are experiments you've not published the results of in any scientific journal, correct?

Dalley Graff

A That's correct.

Q And you described your other investigations of injuries and bloodstain patterns, correct?

A That's correct.

Q And in all of those cases, your prior investigations, did you always know what caused the bloodstains?

A If I could add, I also do review what is published by other experts in the field or people who may be experts in the field and look at their data and look at, for example, the high speed videos particularly. For example, those that were created by Michael Taylor and Epstein and -- forgot the third one's name now.

Q Did you cite any of those in your report?

A I did not list those in the report, but those, again, are going back to high speed videos and looking at known sources of blood, known causes of bloodstains and how the bloodstains were formed and what the result looked like. So not just on the experiments that I have personally done but what I have observed in others and what has

Dalley Graff

been published by others.

Q So in the cases where you knew the cause of the bloodstain, could you tell us how you knew the cause of the bloodstain?

A For example, a massive head trauma and I can see the fragmentation and the cause of the massive injury is present, such as self-inflicted shotgun wound to the head and the shotgun is there. So you know the source. And in the context of the scene, there are no other sources available. So this was the cause.

Q So do you have any known-cause investigations in your past involving pedestrians and motor vehicles?

A Yes.

Q Okay. Like what?

A Well, for example, the girl is run over, and she's got a tire impression; and she has an injury; and that matches to the bloodstain under the vehicle that ran over her.

Q So the case -- what you just described is a case where you concluded that -- from a bloodstain, that a certain thing caused the bloodstain; right?

Dalley Graff

I'm asking: are there any situations that you've reviewed where you're looking at a bloodstain and you know with no doubt what caused it, either because you were there when it got caused or there's a videos of it getting caused, as opposed to a situation where you've reviewed a bloodstain and use your analysis and concluded what caused it?

A That I have reviewed direct information such as a video of the act in progress that led to the bloodstain, I have had situations where that has happened. Like I said, one where there is, obviously, in the context of the scene, one and only one possibility.

Q Have --

A I also include DNA analysis and such where other evidence, in conjunction with the blood together, excludes outside or other causes.

Q Okay. Well, I guess what mathematical models do you use to explain how bloodstain pattern analysis is created -- strike that.

What mathematical models do you use to determine how bloodstains pattern are created?

A If by mathematical model if you mean

like a specific algorithm that you just plug in and here's what the result is, there's not one -- any such thing that I'm aware of.

Q Okay. So what models, maybe they are not mathematical, but what scientific models do you use to explain how bloodstain patterns are created?

A Well, for some patterns you can see that blood drops are projected toward a surface based on the bloodstains that are on the surface and then knowing how blood moves through the air. And knowing that it's a parabola, we can approximate the area of where it would have originated.

Q So you said knowing how blood moves through the air. What is -- is there a scientific model for how blood moves through the air?

A Again, I'm not sure of how you're using the term "scientific model." We know by things like high speed photography watching these what -- these events as they occur and watching what blood does, and then testing what we think is causing the blood to do that in the air and actually reproducing those results in various circumstances in controlled experiments.

Dalley Graff

Q So you think controlled, reproducible experiments are important to establishing the veracity of bloodstain pattern analysis?

A I think that you should have some type of controlled experiments if you are going to say this action caused this bloodstain, that you can do that same action and create that same bloodstain.

Q Okay. Is there -- you just said blood travels through the air as a parabola, right?

A The overall -- it's path is a parabola through the air.

Q Okay. So can you describe mathematically what a parabola is?

A I can describe -- depending on the blood traveling, a parabola is something that has a portion of its flight path is almost flat or straight, but at some point it curves.

Q Okay. So are you aware that parabolic flights, I mean that's a theoretical thing; right?

A It's an observable act.

Q So do you think -- are parabolic arcs for projectiles produced in vacuum circumstances or non-vacuum circumstances?

A It's been a long time since I studied

Dalley Graff

vacuums.

Q But you did say that your understanding is that blood moves in a parabolic fashion through the air?

A Yes.

Q Okay. But you don't know if that's true whether it's in a vacuum or not in a vacuum?

A I've never done experiments with blood in a vacuum.

Q Okay. Do you know if blood is a Newtonian or a Non-Newtonian fluid?

A The issue of Newtonian and Non-Newtonian was examined by Anita Wonder from California a number of years ago, and I don't think there is a single answer to that. In some -- it has some characteristics of both depending on its environment at the time.

Q So "it just depends" is your answer?

A I'm saying it's not a simple "yes" or "no" answer.

Q Okay. So what would determine whether or not it's a "yes" or "no" answer in a given circumstances?

A That the characteristics of blood that

is under different forces when inside the body versus outside the body. And the research that I did -- the studies that I did a number of years ago, particularly when Anita Wonder published her book, was that it's not relevant to the bloodstain patterns themselves.

Q Okay. So whether or not -- your testimony is the characteristic of the blood, whether it's Newtonian or Non-Newtonian, does not effect bloodstain pattern analysis; right?

A I'm saying that blood has -- at least at the time that I studied that, that it has some of the properties of both.

Q Okay. So do you know whether cerebrospinal fluid is a Newtonian or Non-Newtonian fluid?

A I don't recall studying it in terms of Newtonian or Non-Newtonian.

Q Okay. Have you studied or ever published anything regarding how spinal fluid or basically non-blood body fluids, the patterns they make when they're spilled?

A To some degree, yes.

Q Not as much as bloodstain patterns, I

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take it?

A Well, cerebrospinal fluid has some properties that are different from blood and have some differences. So, for example, I believe it has a much lower viscosity, and so then we don't see the same type of patterns that we see in blood. That is it's much more difficult to look at it and say, "Well, this was a single droplet in air that was spherical in air." I don't know that that's true of cerebrospinal fluid as much as it is of, say, blood.

Q What about brain tissue? What have you studied about brain tissue?

A Well, brain tissue is not a homogenous substance. Blood is much closer to being homogenous than brain tissue is. When we look at cerebral tissue, you're looking at quite often some connective tissue. You're looking at a lot of very soft tissue, a lot of fluid in the blood. Something that is very fragile. Something that tends to break apart so...

Q So brain tissue is not a fluid per se?

A No, it's not.

Q Okay. So have you studied the flight

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dynamics of brain tissue?

A Well, to my knowledge there's not a specific flight dynamic for -- of, say, brain tissue because, again, you're not talking about a single homogenous substance. You're talking about various types of cells grouped together, and then some portions of brain tissue are going to have a sort of a connective tissue type of covering, the meninges.

Q But you have studied the flight dynamics of blood?

A Yes.

Q Okay. And you've studied the patterns that blood makes when it hits a solid surface, right?

A Yes.

Q Okay. Now, you may not have published on those, but you've studied those at length; correct?

A Yes.

Q Okay. But on brain tissue, you haven't studied the flight dynamics. And if I understand your testimony correctly, it's sort of impossible to guess at the flight dynamics of brain

tissue because it is not homogenous; correct?

MR. BUNT: Objection to form.

BY MR. WHITE:

Q You still have to answer.

A Well, I'm sorry. I'm not sure I understand the question. As I said, I don't think there's a single flight dynamic of brain tissue because you're looking at different combinations of tissues together. So if some of that -- like I said, some of it is going to be more fluid than others. Some is going to have some connective tissue with it. Some brain tissue may have bits of meninges that is adhered too; some maybe not.

Q All right. Just a second. Okay. So let's look at -- I'm going to mark this as Exhibit No. 4.

(INVESTIGATIVE ANALYSIS & CRIME SCENE RECONSTRUCTION COURSE INFORMATION RECEIVED AND MARKED AS PLAINTIFF'S EXHIBIT 4 FOR IDENTIFICATION.)

BY MR. WHITE:

Q Do you recognize that document?

A I have not seen it before now. I recognize the logos and such.

MR. WHITE: Let's go ahead and get it

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marked. If you hand it back to me, I'll put a sticker on it.

Q Is that a marketing flier for one of your trainings?

A It appears to be.

Q Okay. So on there, do you see where it says that you have a five-step process for accident reconstruc -- I'm sorry -- or crime scene reconstruction? I believe it's the fourth bullet point down on the second page.

A Yes, I see that.

Q What is your five-step process for correlating evidentiary relationships between scene evidence?

A The five steps as we list them would be to begin with review so you know what materials you have available.

Organization, to have a system to organizes all the information that you have so that you can locate it as you need it for quick reference and for later review and audit of the information.

Then preparing for analysis, which would be things like looking at images, looking at

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them at 100 percent, adjusting the histograms to see what you can see in dark places depending on, again, things like the quality of the image, whether it's in the correct format and those kinds of things to possibly -- depending on what kind of reconstruction possibly even do a three-dimensional model, virtual models to help understand the three-dimensional dynamics.

So preparation and then analysis would be actually looking at specific, for example, bloodstain patterns. What are the characteristics of those patterns? Describing those characteristics. See how that relates to other evidence, such as wounds, potential forces, such as weapons what's available in the context of the scene. Consider all -- all scenarios presented by the evidence and scenarios that others might present and to analyze those.

And then I think the last step is conclusions and reports to do things like flowchart and see what items of evidence relate to each other where you can and cannot establish connections whether you can or cannot establish sequence of events so identifying actions that must have

occurred to produce the evidence as it's available and then try to sequence those actions if possible.

Q Okay. So let's jump to the report here. I'm trying to move through this quick because I know we're short on time. So if you'll go to page 1 of your report. Do you see Footnote No. 1?

A Okay.

Q What do you mean when you say "A bloodstain pattern is one or more related bloodstains created by a single action"?

A I mean that a bloodstain pattern is made up of one or more bloodstains that are all created by a single action.

Q What do you mean by a "single action"?

A For example, if you're looking at a pattern that you say that's a castoff, which would be -- would indicate that something that had wet blood on the object was in motion so that it separated from a ligament of blood, which then separated into individual droplets, which then struck a surface and would have specific characteristics, such as a fairly linear distribution on the surface and a progressive

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change in shape within the individual stains within that pattern. So a single action that would have produced them is the movement of a bloodied object.

Q Okay. So in this investigation of the case at hand here from April 30, 2022, are you assuming or do you conclude that Nehemias was initially hit and then struck the Toyota Camry?

A Based on the bloodstain, there is an impact pattern. And from the impact pattern, we can approximate the area of impact, and then there is another pattern of blood and tissue that's in a different place and different orientation and therefore two different impacts.

Q So would it be fair to say then that you're looking at all the patterns of blood and various other things in this accident and concluded that there were two actions?

A Well, there are two related actions because the one kind of caused the next, but they're still separate actions, even though they happened very, very short in time; but they're actually separate actions.

Q Okay. So -- but you're -- just to make sure I got it 100 percent right, your thinking

or conclusions are that there are two impacts that caused the various bloodstain patterns on the scene in this case?

A That there are at least two, yes.

Q Do you think it's possible there are three?

A Certainly. There can be more than that.

Q Well, I'm trying to figure out what your opinion is. Do you think it is two, or is it at least two? And if it's at least two, how many?

A There's at least two. One that makes the impact pattern on the central barrier that's a separate pattern from what's on the right side and toward the front of the car.

Q And so do you think that the impact pattern or the impact pattern on the barrier, using your words, was that from the initial impact?

A In my opinion, that would have to be from the initial impact.

Q Okay. So you think of at least three actions that caused bloodstain patterns in this case. The first one was the impact with the Ford Explorer that caused the impact barrier on the

median barrier?

A I think there was an impact to the blood source -- which in this case, from the information that I have, would be something that caused an open head wound and therefore would project blood. And we see just the blood going towards that wall.

Q So your conclusion is that the impact pattern on the median barrier is blood from Nehemias' head?

A Based on the available information, I see evidence looking at the overall scene that is consistent with an open head trauma, and that would be consistent with an impact to the head causing the bloodstains on the barrier.

Q But there -- you haven't reviewed an autopsy of Nehemias Santos' body, right?

A No.

Q Okay. Have you reviewed a pathology report on Nehemias Santos' body?

A No.

Q What have you reviewed to determine the injuries on Nehemias Santos' body from April 30 of 2022?

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A There's evidence at scene that would be consistent with an open head wound.

Q Okay. Is there evidence at the scene of other injuries caused to Nehemias Santos?

A I don't have anything I could point to other than the evidence that is consistent with an open head wound. He may have had other injuries. I don't know.

Q So it's possible?

A He could have had other injuries. That's possible. I don't know.

Q Okay.

A It doesn't change the part that I do know.

Q Okay. But were you -- in a perfect world, would you have preferred to have gotten an autopsy report on Nehemias Santos?

A I could have done more with the analysis had I had a thorough examination of his wounds, such as what would be presented from an autopsy.

Q And there's no pathology report that you've reviewed that shows what the droplets that you've analyzed consisted of, is there?

Dalley Graff

A I'm sorry. I'm not sure if I understand the terms you're using. Nobody collected droplets in the air. There's the stains on the surface.

Q So is it common practice for bloodstain pattern analyst to use reagents -- I think that's how you pronounce it -- to determine where blood is at a scene?

A The term is reagents.

Q Reagents.

A And various reagents are used to identify, if possible, what is suspected as blood. It's not always required. But if it's questionable -- if you're not certain, then there are tests to do.

So you may have a stain that's sort of a brownish color that could possibly be dried blood, then I would use the reagent -- personally I prefer the Kastle Meyer test. And if that's positive, then you move forward with the analysis.

Q Were reagents for the Kastle Meyer test used on this scene involving Nehemias Santos?

A Not that was reported to me.

Q Okay. So let's go to page 3 of your

report. So at the first sentence at the top of this page says: "A wide path of blood/fluid was on the pavement approximately parallel to Nehemias Santos' left side." Do you see that?

A Yes.

Q Okay. Is blood/fluid a term of art for bloodstain pattern analysts?

A I don't know that it's a -- you say a form of art.

Q A term of art. Sorry.

A A term of art. It's a simple way in the English language that sometimes if you have two things together that it could be either/or, and/or, or both.

Q So you don't know if what you're looking at is just blood or fluid or maybe both?

A It does appear to be primarily blood; however, there are some characteristics there that appears that there is a mixture of other fluid.

Q You don't know what those other fluids are, right?

A Well, I think in the context of the scene, given that everything is consistent with a massive -- or an open head wound, the cerebrospinal

fluid would, in fact, in an open head wound would be mixed with the blood.

Q So is it possible if there's -- if fluids related to a vehicle mixed in?

A I don't see any evidence of petroleum-like fluid.

Q What about, like, a transmission fluid?

A Again, it's a petroleum-type fluid.

Q Well, what about -- sorry -- fluid for a radiator?

A I think you're referring to water.

Q No. I think there's, you know, you can put non-water substances in a radiator. But, I mean, do you see any automobile fluid -- besides on this (indicating) -- in the materials you reviewed for this case?

A I don't see anything that looks like it's a petroleum based mixed with the bloodstains that I see.

Q Okay. So now you see in Footnote No. 6 here, you see: "For purposes of this report 'tissue' refers to masses that appear to be comprised of cerebral material, body fat, and body

fluid"?

A Yes.

Q Okay. So is it normal for bloodstain pattern analysts to discuss how tissue is cast via an impact?

MR. BUNT: Objection to form.

BY THE WITNESS:

A I think it would not be unusual for someone in a bloodstain report to refer to tissue and bits of tissue being present. That's not the same as saying specifically the pattern as such, other than, say, the distribution of those of the bits.

BY MR. WHITE:

Q And are you trained on analyzing the patterns created by tissue?

A I certainly can describe what I see.

Q But can you draw conclusions from patterns of tissue that you see?

A To some extent, yes.

Q Based on what experiments?

A Well, it's not. It's based on observation. But looking at brains over the years and how the brain tissue holds together or doesn't

and seeing the pulverized pieces basically where the pieces come apart and land on the surface, I know they didn't start on the surface. So they had to have come from the body.

Q So you don't have any experiments you conducted with tissue or brain matter or skull fragments, right?

A With -- with tissue from a body, that would be unethical if you're talking about doing experiments on a person's brain to see what the brain tissue would be. But I have done experiments with tissue, say, animal tissue to see what happens in certain -- in certain circumstances.

Q Have you published the results of those experiments?

A Not outside of casework.

Q Okay. So those experiments and your publications have not been peer reviewed?

A Not other than presentations I've made at various professional organizations.

Q Okay. So on page 3 you say "a drag-like mark on the pavement extended from Nehemias Santos' right foot." What does a drag-like mark on the pavement mean?

Dalley Graff

A It was a mark on the pavement that went from -- extended from his foot to the blood pool out on the roadway, and it looked like something had been dragged to create that.

Q Okay. So can you point out where that drag-like mark is on Figure 4 of your report?

A I don't think it's quite visible or certainly not the whole pattern visible in Figure 4.

Q Okay. So you say in your report that Nehemias Santos' injury or his cause of death was blunt force trauma, right?

A I said that?

Q So on page 3 you say: "The cause of death was reported as blunt force trauma." Do you see that?

A Yes. I see that I cited the State of Texas Certificate of death.

Q Okay. But there was no medical report that you reviewed, right, to reach an independent conclusions that he died of blunt force trauma?

A It's not an independent conclusion. It's the conclusion stated on the State of Texas Certificate of Death.

Dalley Graff

Q Okay. Now, if you look at Figure 3, can you identify all of the possible injuries to Nehemias Santos?

A No.

Q Okay. Do you see -- I mean, do you see what appears to be something on his head, right?

A Yes.

Q Okay. Do you see where his right shoulder -- his shirt is torn?

A Yes.

Q Do you see blood on his right arm?

A It appears to be blood all along the surface of his arm.

Q Does it appear that his pants and most of his clothing are soaked with blood?

A It appears that way.

Q Okay. Is that incorrect? I mean, would you conclude from what you see that his clothes are soaked with blood?

A It's hard to determine from just this picture. It appear that they very well may be saturated.

Q Okay. What about his right leg? Does

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his right leg appear to be injured?

A I cannot tell from this picture.

Q So if you see in your Footnote No. 8, do you see where you cited a police report saying that the right leg was obviously broken?

A Yes.

Q Do you agree that, looking at Figure 3, it looks like his right leg is broken?

A I cited that the officer said right leg was obviously broken. However, she didn't detail why she said it was obviously broken. And I cannot -- looking at this picture, I cannot tell you what the state of his leg is.

Q Just because it's not a good enough photo, I guess?

A It's not from the right angle to tell.

Q Okay.

A The right leg may or may not be in a position that looks broken.

Q Okay. So, right. For you to know if he had a broken right leg -- a fracture in his right leg, you'd probably have to look at a report done by some sort of forensic examiner; right?

A Well, for me to say whether or not I

thought it was broken, I would need to see something that was an obvious dislocation or a position that the leg could not be in if the bones were in tact.

Q And -- and you have --

A Or something like that. Or a medical -- some medical examination that actually says, "Yes, the bone is broken."

Q And you haven't been seen anything like that in this case? So you just don't know if his right leg is broken?

A I don't know.

Q Okay. So in Figure 4, here you've highlighted an area and captioned it as "Bloodstains on barrier." What was your basis for doing that?

A The basis for doing that is looking closely at this image that is not whole image but zooming into this area and referring to other images of the same area.

Q Okay. How do you know that the stains on the median barrier are blood?

A They appear to be blood to me primarily. But, again, looking at all the images

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together and in particular comparing those different ones. One of them I could see what appears to be extensions from the original impact -- the leading edge of that stain and tails, if you will, where the blood would have collected toward the termination or the ends of those trails, and I have seen that same thing numerous times in bloodstains.

Q Okay. So you've said you've seen it numerous times in bloodstains, but that seems a little circular. How do you know that that is blood on the barrier?

A Again, that's based on my observation and my experience over the year.

Q Okay. How do you know it's not other body fluid?

A Other body fluid doesn't act quite like that.

Q Okay. What experiments have you conducted with non-blood body fluids that tell you how -- what sort of patterns those fluids make, for example, on a barrier?

A Well, I've looked at the difference between blood and other fluids. So body fluids, it

depends on what specifically you're talking about. But those with much lower viscosity, for example, urine, would do about what water does or similar. That's not what blood does.

Q Okay. I mean, there's obviously different kinds of body fluids other than blood and urine. How do you know that the marks on the median barrier there are not blood mixed with some other body fluid?

A There may be traces of cerebrospinal fluid or --

Q It's possible?

A It would be traces because if you had very much of the other in it, then it would not have this appearance.

Q Because your testimony is you know how all body fluids act when they are cast onto a barrier?

A Not all body fluids. There are some body fluids I have not tested for the same patterns.

Q So -- so then how do you know what made those patterns on the barrier, if you haven't tested all body fluids?

Dalley Graff

A Well, the other body fluids I can think of that I have not tested are definitely not that color.

Q Okay. So what is the resolution of the photos you reviewed in your report.

A I think I'd have to go back and recheck. I think the resolution of this one -- I think it was 300 by 300.

Q Okay. So -- and your opinion is you can reach an expert opinion by reviewing photographs of that resolution and doing a bloodstain pattern analysis; is that right?

A By looking at everything in the scene and by looking at the various images and comparing them to be sure that what I'm seeing in one is present in the other in some degree.

Q Okay. So you said that the stains on the median barrier are quote, mostly circular. What does that mean?

A That they're more round than elliptical.

Q Okay. So when you say more round than elliptical, I mean you can measure any elliptical stain; right?

Dalley Graff

A Yes.

Q And you do that by measuring the minor and the major axis of the elliptical stain?

A Depending on the target surface, yes.

Q Did you do that here?

A No.

Q Why not?

A Because the stains are more circular and measuring individual stains doesn't really give you any more information. It's still fairly circular, and there's a lot of potential error in measurements the more circular that the stain is. So there's no point in doing any specific measurements to say, "Well, this is between 70 to 90 degrees."

Q So when you said that the stains on the barrier are mostly elliptical -- or are mostly circular, do you mean that most of the stains are circular and there's a couple that are elliptical, or are you saying that all of the stains are circular?

A That, basically, all of the stains that I could identify had a rounded leading edge; so they originated as spheres before they impacted

Dalley Graff

and then formed the stains on the wall. That -- and that the angle of most of them, based on that shape, was somewhat perpendicular being anywhere from -- well, it could be directly 90 degrees to about the center. Some of them look very, very circular. When you move to the north end of the pattern, some of them have a little bit more of an elliptical shape, not quite as rounded on the west end of the pattern.

Q Well, that median barrier runs north to south, right? So are you saying --

A Okay. I'm sorry. From the north to the south end. So the north end, they seem to be more circular than more to the south end. The south end, you tend to see a little bit more directionality to the individual stains.

Q And that -- and I appreciate that detail. That's not in the report here, right? That the elliptical nature changes on the barrier, is it?

A There still mostly circular and elliptical.

Q Okay. But you've added some detail, right?

Dalley Graff

A Some of those. And, again, you have to look at them individually by going back to all of the pictures.

Q And have you reviewed each drop individually?

A As many of them as I could focus on.

Q Okay. If you could go back, would you maybe change this part of your report where you said it's mostly circular and maybe say they're circular on the north part of the barrier but more elliptical as you head south on the barrier?

A I don't think that it's a significant change to say that. They're still mostly circular to elliptical.

Q Okay. But do you agree that explaining which direction on the barrier they're circular versus where they're elliptical would add some detail here, right?

A I don't -- I don't necessarily agree that changing those words changes the meaning at all.

Q Okay. So in, I believe we're on page 4, Figures 8 and 9, you've identified some stains. Do you see those?

Dalley Graff

A Yes.

Q Okay. So is it your expert opinion that these are bloodstains?

A They are not all bloodstains.

Q Okay. How do you tell which ones are blood and which ones are not?

A Well, looking at Figure 8, some of those stains don't have very much color -- the color that blood would be. And some of those that that are very elliptical don't have tails, which would be where the concentration of cells would be. Then it would be darker in the tails. That happens with blood. That does not happen with other fluids. So some of them appear to be possibly blood-tinged, so some fluid that's not specifically blood.

Q Okay. So you think those -- at least some of the patterns shown in Figures 8 and 9 are not bloodstains?

A That they are not primarily blood. They're blood-tinged, but they appear to be some other fluid in connection with blood.

Q And can you explain the difference or how are patterns different when it's not blood

primarily creating the stain?

A When it's something of a significantly different viscosity, such as water will make a different pattern -- have a different pattern. Be more dispersed. Breaks up more than blood does. It's closer to blood. So you can still have whatever the fluid is having its viscosity to it that it holds together so you still get an elliptical stain with the fluid continuing to form the tail for directionality, if you would.

Q So by looking at a stain what you're saying is you can guess whether or not the viscosity of the fluid was close to blood or not like blood, right?

A I'm not guessing the viscosity. I'm saying that as a result of the stain that if you compare it to other fluids, that whatever this is, if it has the same characteristics or similar to a bloodstain, then it must have had similarities as a fluid to blood and therefore be, for example, closer in viscosity to blood than water.

Q So if you saw a pattern that it looked like it had a similar viscosity to blood, that doesn't tell you whether or not it's blood or not;

Dalley Graff

it just tells you that you're looking at a fluid that has a viscosity similar to blood; right?

A I'm sorry. I don't follow.

Q So if you see a pattern, what you're saying is you can analyze the viscosity of the liquid that created that pattern; right?

A I'm not measuring the viscosity from a stain. I'm simply saying that stains with -- fluids with similar viscosity can have similar characteristics in the stains that are formed.

Q So if I -- so if you know the viscosity of a fluid, you can predict what the patterns made by that fluid will look like?

A Not from viscosity alone.

Q Okay. So what else would you need to know?

A Well, what is the fluid? Is it a very homogenous fluid, or is it a mixture?

Q Okay. So you have to know what the fluid is before you can predict what patterns that fluid would make?

MR. BUNT: Objection to form.

BY MR. WHITE:

Q I mean, that's what you just said,

right?

A I don't know what you just said.

MR. BUNT: Same objection.

BY MR. WHITE:

Q So you have to know what a fluid is before you can predict what patterns that fluid will make, right?

A I'm not predicting what patterns it will make. I'm looking at the patterns that were made. And if the patterns that were made have this -- some similarities to what we see in blood, then, by extension, that means that there are some similarities in those fluids. But I'm not saying what the viscosity was, and I'm not predicting what some other fluid, not blood, would do that.

Q So you understand that a prediction is just another word for a hypothesis about what happens, right?

A No.

Q So you don't think hypotheses are predictions?

A I don't think the two terms are synonymous.

Q Okay. So have you ever made

hypotheses about how patterns will form based on an ejected fluid?

A A hypothesis is based on the evidence at hand. A hypothesis is, if you will, an educated guess. Here's what I think could have made this. That's a hypothesis. Then you test the hypothesis to see if, in fact, this could create that. That's hypothesis.

Prediction says I know this will happen. And those are two different things.

Q Okay. So when you look at the elliptical stains on, say, Figure 8, based on what you're looking at there, can you determine whether or not -- like you said, that's a blood-tinged fluid? Do you know what kind of fluid it is?

A I don't specifically know in the context of the scene. I look at what's available in context of the scene. Given that there appears to be some cerebral matter in the scene, then cerebrospinal fluid I know is associated with that. I know that the tissue gets there because it had to be in flight coming from a source. So therefore the fluid along with it would come from the source.

Q Well, how do you know that these

elliptical stains were created by a fluid associated with this accident?

A I just look at the entire car to see if there's anything similar because I also look at what's across the glass and what's on the trunk lid and what's on the other side of the vehicle.

Q Well, I mean, is it possible that those are just streaks from some sort of, like, a prior car wash on Figure 8?

A They're not consistent with a car wash, which is primarily water.

Q What about soap?

A That would be a very strange way to put soap on a car.

Q So are you an expert on how soap dries on cars?

A I wouldn't say I'm an expert.

Q So how do you know that those streaks in Figure 8 or even Figure 9 aren't organic matter from bugs or soap or anything not related to this accident?

A Well, we have two different things between Figure 8 and Figure 9.

Q Well, take them both one at a time.

Dalley Graff

A Well, Figure 9, there's an overall pattern. There's very similar stains in the same orientation over the same part of the car. There appears to be a single source to have those similarities.

Q So you're concluding that because you see patterns that seem to have the same source, then they must be related to the accident? That's your expert conclusion?

A In the context of the scene and looking at all of the images of the car. I don't see for example these things on the front end of the car. So I looked at all of the images of this car looking for anything similar to this. I don't find it anywhere other than here in this and comparing this to pictures of the other side of the trunk.

Q Okay. So how do you know the things that you circled in Figure 9 are, in fact, fluid stains?

A That's just my observation. That's what they appear to be.

Q Okay. But you didn't test them in person or anything like that, right?

Dalley Graff

A No.

Q Okay. So they just look like black flecks, right? I mean, is that a fair description?

A No. I wouldn't describe them as black flecks.

Q So there's some black flecks, like, immediately to the right of the light that you didn't circle. Do you see those on Figure 9?

A I'm sorry. Figure 9?

Q Uh-huh.

A Figure 9, I outlined just a few, not all of them. There was no attempt to outline every single stain.

Q So do you think that every black mark on Figure 9 is a bloodstain?

A I don't know.

Q Okay. Why don't you know?

A Well, one thing because I can't see it printed in this small print, but at the time I just highlighting certain stains that I could identify -- that I felt I could identify.

Q So you're saying that those other stains in Figure 9 might not be related to the accident or might not be bloodstains?

Dalley Graff

A They appear to be bloodstains. They appear to be related to these, but I don't recall now what all I looked at there. But I would just, again, highlighting a sample of what I see and what I could identify as stains.

Q Well, so your expert -- is your expert conclusion that all those black stains in Figure 9 -- sort of in the light area, by the light -- that those are all bloodstains?

MR. BUNT: Objection to form.

BY THE WITNESS:

A Without looking at it in a view where I can actually see them, I can't tell if there are any that I would exclude as being bloodstains.

BY MR. WHITE:

Q Okay.

MR. BUNT: It's 10 after 1:00 so...

MR. WHITE: All right. So I guess that's as much as I'm going to get today, unless you want to give me a little latitude.

MR. BUNT: I can give you about five more minutes.

MR. WHITE: Okay. All right. Let me get to the fun stuff.

Dalley Graff

Q Let's go to page 7. Just let me know when you're there. So you see Figure 19 of your report?

A Yes.

Q Okay. So you say "In the context of this scene, if the Explorer damage was caused by an impact with Nehemias Santos' head, then Nehemias Santos' head was lower to the level of Explorer headlight." Do you see that?

A Yes.

Q Okay. So is it your conclusion or your assumption that Nehemias Santos had his head struck on the right side by the Ford Explorer?

A I would say it's neither.

Q Okay. What would you say it is?

A That if his head, wherever the wound is, was injured in this impact, then his head has to be in the area of damage to the Ford Explorer. So if it's -- so if the initial wound is to the right side, then this would be an approximation for where his head would be and then by extension the posture of where his head would be. It's simply an approximation.

Q So do you know that the initial impact

Dalley Graff

was to the right of Nehemias Santos' head?

A I don't know that.

Q Have you concluded that from reviewing the evidence? Is your expert opinion that the initial impact was to the right of Nehemias Santos' head?

A It's only based on the fact that there is a towel or something that's pressed to the right side of his head.

Q Is it possible that something else was the initial -- a different part of his body was struck by the Ford Explorer as part of the initial impact?

A I saw evidence in the scene of an open head wound, regardless of whether the initial impact is to the side or the top or even the left side, I don't know because there's not a documentation specifically of the wound, other than the image I captured where they had put something to the right side of the head.

Q Okay. All right. It's not a trick question. I take that to mean you do not have an expert conclusion about how the impact to the right side of his head occurred, right?

Dalley Graff

MR. BUNT: Objection to form.

BY THE WITNESS:

A I see evidence in the scene that he had an open head wound; therefore, if -- as I say, if the damage to the vehicle was associated with that wound, then his head has to be at the level of that damage.

BY MR. WHITE:

Q And you're saying "if" because you don't know if his head was what caused the damage to the headlight area of the Ford Explorer?

A Other than in the context of the scene, I didn't find any other. Because it's not caused by an impact with the Camry. So what else in the scene? There's nothing else in the context of this scene that provides a source of that damage.

Q But you don't know if maybe Nehemias' shoulder hit the headlight area or if some other part of his body hit the headlight area and then the head injury occurred subsequently? You just don't know, right?

A Well, I know that something has to hit the head, and I don't see any evidence of a

Dalley Graff

catastrophic injury to either of the shoulders.

Q But, I mean, you don't know if there's an injury to his shoulder? You've already testified to that, right?

A Well, there could be an injury. I said catastrophic. Something that could produce -- that an impact would produce the bloodstains that we see on the barrier.

Q Okay. But you don't know if his head hit the road or his head hit the Camry or his head hit the Ford Explorer, right? You just don't know between those possibilities, right?

A Well, I don't think there's evidence that his head could have hit something after the wound was opened.

Q Okay. But you don't know what opened the wound in his head, right?

A In the context of the scene, the only source that I find in the scene context is the Explorer.

Q So if his head hit the road, right, is it possible that any evidence of that got covered up after his body got moved behind the Camry?

A The head just hitting the road, say,

Dalley Graff

from a fall is not going to produce the open head injury that would then lead to the evacuation of the Calvarium, which is what the evidence appears to show.

Q So in you're saying if -- in your opinion, if Nehemias Santos' head was slapped down on the pavement, it wouldn't have produced an open head wound?

A Well. It wouldn't produce -- depending how it impacted.

Q So it's possible?

A It's possible that a hard impact to a roadway can certainly cause a skull fracture, possibly cause an open head wound. However, it would have to somehow bring that head back up to a place where cerebral tissue could be expelled or projected along the right side of the car, the roof of the car, towards the trunk, the open lid of the trunk, and to leave and to go down and be on the pavement behind the car.

So that's not consistent with falling to the ground and having that kind of injury or to have that injury caused by the pavement. It wouldn't be able to get up from there.

Dalley Graff

Q But you're not an expert on the flight dynamics of brain tissue, correct? You already told us that, right?

A Again, there's not such a thing as a simple flight dynamics of brain tissue. We can see what happens when tissue is moving through the air and some of the characteristics and how that's different from, say, a fluid going through the air because now you have these pieces that are not homogenous, don't always stay together, may come apart. There's various things that happen to a mass of tissue that would not happen with blood.

Q So it's hard to predict how tissue moves through the air because it's not homogenous, right?

A And I'm not predicting. I'm simply stating the conclusions that I've observed in the result.

Q So you've never performed hypothetical -- you've never performed experiments on how tissue moves through the air, right?

MR. BUNT: Objection to form.

BY THE WITNESS:

A I have observed and studied videos of

actual woundings at the time they have occurred. I have done some experiments myself to simulate, for example, what might happen with, say, brain tissue by shooting into animal tissue, not living animals, to simulate and see if this action would produce a result similar to what's seen in the scene.

BY MR. WHITE:

Q What is a dispersion cone?

A A dispersion cone is when some force causes, for example, blood, to be projected from a source, and as it moves away from the source individual droplets move father away from each other, and the three-dimensional result in the air is called a dispersion cone.

It's not a physical cone. It's not an exact location. It's a general area. So if it hits a target surface, the farther away from the source it is, generally the less dense the individual stains in the pattern will be.

Q So can a dispersion cone be as large as 360 degrees and as small as, say, 10 degrees?

A It really depends on the scene in which this happens.

Q But it could be 360 degrees and as

small as 10 degrees?

A Certainly. If you have a -- if we're talking about head injuries in particular. Something like a rifle or shotgun to the head where there's nothing blocking anywhere around, then that could actually send tissue 360 degrees around the source.

Q What about back splatter? What is that?

A Back splatter is when, upon impact of something to a blood source, some of the blood may, in fact, travel back towards the source of the force.

Q Did you see any back splatter on the Ford Explorer?

A I couldn't say that it was back spatter, but I did see some splatter in the Ford Explorer.

Q Now, I think in your report you described the spatter in the Ford Explorer as being I think you said it was consistent with arterial blood; is that right?

A I'd have to see where it says that.

Q It's Footnote 14. You called it

consistent with a projected pattern, such as a breached artery.

A I'm not saying it was a breached artery. I'm just saying it's a projected pattern, and one place that you see that type of pattern is when there's a breached artery. There are other circumstances that can produce similar stain.

Q Like a back splatter?

A No.

Q Okay. So --

MR. BUNT: It's 1:20.

MR. WHITE: You calling it?

MR. BUNT: I'm calling it.

MR. WHITE: Okay.

MR. BUNT: Just a few very quick questions.

EXAMINATION BY MR. BUNT:

Q Just first of all, if the vehicles involved in an accident have already been repaired and they have already been cleaned such that any blood spatter, tissue spatter, bloodstains, et cetera, are no longer present, is it common in -- is it common for someone such as yourself to rely upon whatever photographic or video evidence there

is of those stains and spatter to make an analysis?

A I would say it's common in the bloodstain community to rely on documentation of the original stains, regardless of what happened to the surface afterwards.

Q And if the surfaces afterwards just no longer contain those stains and all you have is photographs and videos, is that what you have to rely upon are the photographs and videos?

A Yes. I would always rely on the photographs -- photographic or video recordings from the original, even if I were to look at the vehicle itself later.

Q But the reason you haven't looked at the vehicles here is because those vehicles have been repaired and cleaned of any stains, correct?

A Well, I -- I didn't really consider looking at the vehicles. I haven't had the opportunity to do that other than through the photographic evidence.

Q Okay. But sometimes photographs and videos are all you have, correct?

A Yes.

Q The photographs and videos that you

Dalley Graff

had here, do you believe that they were of sufficient quality so that when you blew them up -- when you enlarged them and put them through your processes with the imaging software you have, you believe they are adequate to support whatever opinions and conclusions you had formed in this case?

A Yes. I think they were adequate for the parameters that I used in my conclusions.

Q All right. And as to why you haven't reviewed an autopsy report or a pathology report, to your knowledge, was any autopsy report performed on Mr. Santos?

A I did request such reports and was advised that they were not available.

Q Okay. And as far as any other type of pathology report, something confirming exactly what caused his death, you're not aware that any such reports exists, are you?

A I'm still not aware of any. It has not been provided me you.

Q As far as you know, what we have are the -- is the testimony of the witnesses that were at the scene, which I guess would include the

police officers and the paramedics, as well as photographs and videos?

A I'm not sure I understand the question. My conclusions are based on my observations of what I see in the scene, not relying on anyone -- on any one statement of what they said the injuries were.

Q Okay. But when you say "the scene," you mean the photographs of the scene; correct?

A Yes.

MR. BUNT: All right. That's all.

THE REPORTER: Mr. White, will you be purchasing the original and one?

MR. WHITE: Yes.

THE REPORTER: And, Mr. Bunt, will you be purchasing a copy?

MR. BUNT: Yes, we want a copy. And can you also just give us kind of a rough copy as quickly as you can?

THE REPORTER: Yes.

* * * * *

STATE OF NEW YORK)
)SS:
COUNTY OF ORANGE)

I, JAIDEN HERNANDEZ, a Court Reporter and Notary Public within and for the State of New York, do hereby certify:

That IRIS DALLEY GRAFF, the witness whose deposition is hereinbefore set forth, was duly sworn by me and that such deposition is a true record of the testimony given by the witness.

I further certify that I am not related to any of the parties to this action by blood or marriage and I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 27th day of December, 2023.

Jaiden Hernandez

JAIDEN HERNANDEZ

I N D E X

EXAMINATION BY PAGE

PLAINTIFF'S EXHIBITS

MARKED FOR IDENTIFICATION

NUMBER	DESCRIPTION	PAGE
Exhibit 1	Scene Reconstruction Report, Bates-stamped 00476.118002323 to 68	6
Exhibit 2	Curriculum Vitae of Iris Dalley Graff, Bates-stamped 00476.118002313 to 21	7
Exhibit 3	Spreadsheet of cases, Bates-stamped 00476.118002322	7
Exhibit 4	Investigative Analysis & Crime Scene Reconstruction Course Information	56

DEFENDANT'S EXHIBITS

MARKED FOR IDENTIFICATION

None

ACKNOWLEDGMENT OF DEPONENT

I, IRIS DALLEY GRAFF, do hereby acknowledge I have read and examined the foregoing pages of testimony, and the same is a true, correct and complete transcription of the testimony given by me, and any changes or corrections, if any, appear in the attached errata sheet signed by me.

_____________________ _______________
IRIS DALLEY GRAFF DATE

Sworn to before me this ________
day of __________________, 2023.

X_________________________________
Notary Public

ERRATA SHEET

FOR THE TRANSCRIPT OF:
IRIS DALLEY GRAFF
DECEMBER 14, 2023

PAGE LINE FROM TO

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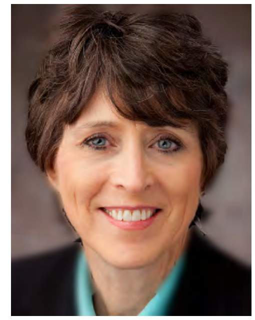
IRIS DALLEY GRAFF DATE

EXHIBIT E

IRIS DALLEY GRAFF
Forensic Analyst
Phone 918-470-7876
graff.training@gmail.com



SUMMARY

Over 30 years experience in crime scene investigations and forensic biology.
Court-qualified as an expert in crime scene investigation and reconstruction, including bloodstain pattern analysis and shooting incident reconstruction, in U.S District Courts in Oklahoma and Texas, and in State District Courts in Arkansas, California, Colorado, Idaho, Indiana, Kentucky, Virginia, Oklahoma and Texas, and Republic of Kazakhstan

Provided instruction and training in United States, Portugal, France, New Zealand, South Africa and Canada. Also provided remote instruction for Argentina.

EMPLOYMENT

Partner in Graff Investigative and Forensic Training 2016 to present.
Partner in the forensic education and consulting company Bevel, Gardner & Associates, 2008 to 2016.
Oklahoma State Bureau of Investigation 1989 to 2009

Prior to my career in forensic science and law enforcement I was a high school instructor and adjunct professor teaching biology, advanced placement biology, physics and general physical science courses, mathematics, and American Sign Language.

EDUCATION

Master of Arts in Secondary Sciences, 1984, East Central University, Ada. Oklahoma
Bachelor of Science/Biology, 1972, Oklahoma Baptist University

EXPERIENCE

Forensic examination and analysis of crime scenes and items of evidence collected in criminal investigations, particularly crimes of violence and death investigations. Experience includes laboratory analysis, crime scene investigation with emphasis on bloodstain pattern analysis, shooting incident reconstruction, crime scene documentation, evidence identification and collection, forensic animation, and preparation of court exhibits, and training federal, state, and local officers. Laboratory analysis experience includes forensic identification of body fluids, microscopic comparisons, and DNA analysis.

PROFESSIONAL AFFILIATIONS

Scientific Working Group on Bloodstains Pattern Analysis (SWGSTAIN)
Member Spring 2006 to 2012
Ex-Officio 2004-2005

Association for Crime Scene Reconstruction (ACSR)
- Charter Member, Fellow and Distinguished Member
- Secretary 1995 to 2009
- Board Member 1992-1994

International Association of Bloodstain Pattern Analysts (IABPA)
- President 2009-2010
- Regional Vice-President 2003 to 2009
- Member 1992 to present

International Association of Identification (IAI)
- Member, Crime Scene Certification Board 2012-1213
- Member, Sub-Committee for Bloodstain Pattern Identification Training, 2007 to 2012
- Member 2003 to present

Oklahoma Division of the IAI
- Vice-President 2008-2010
- Executive Board 2004 to 2008

PROFESSIONAL CERTIFICATIONS

Certified Crime Scene Reconstructionist, IAI, 2011 to 2016
Senior Crime Scene Analyst, IAI, 2003 to 2013
Advanced Law Enforcement Certification, Oklahoma Council on Law Enforcement Education and Training (CLEET), 1996 to 2009
Basic Law Enforcement Certification, CLEET, 1989 to 1996

PROFESSIONAL PRESENTATIONS

Water Closet Drama: Suicide or Homicide
- 2019 IABPA European Conference, Pontoise, France — June 20, 2019

Bloodstain Voices From the Field
- 2018 IABPA Annual Training Conference, Ottawa, Ontario — Oct 2018

Contextual Bias
- Northeast Division of the International Association of Identification — Dec 2017

Case Study: Crime Scene Reconstruction: Terror in the Night
- Northeast Division of the International Association of Identification — Dec 2017

A Bumpy Road to Justice: Context bias, documentation, and case management
- International Association of Bloodstain Pattern Analysts — Sep 2017
- International Association of Identification Annual Conference — Aug 2017

Report Writing for Crime Scene Reconstruction
- Annual ACSR Training Conference, Blackhawk, CO — February 2017

Graphic Investigative Tools in Reconstruction Analysis
- Annual ACSR Training Conference, Nashville, TN — February 2019
- IAI 103rd International Training Conference, San Antonio, TX — July 2018
- Annual ACSR Training Conference, Blackhawk, CO — February 2017

Posing the Scene: Animation of Bloodstain Evidence
- Midwest Forensic Science Center Bloodstain Symposium, Ames, Iowa, August 2009

Homicide or Suicide: Am I My Brother's Keeper
- Oklahoma Division of the IAI, Edmond, Oklahoma, — May 2011
- IABPA European Conference, Zurich, Switzerland, — July 2008

Kidnapping by Caesarian-Section
- OK-IAI 2007 Training Conference, Edmond, Oklahoma, — May 23, 2007
- 2006 IABPA Annual Training Conference, Corning, New York, — October 19, 2006

Terror in the Woods: The Homicides of Charles and Shirley Chick
- IAI 103rd International Training Conference, San Antonio, TX — July 2018
- IABPA European Conference, Middelburg, Netherlands, — February 2006
- 2005 IABPA Training Conference, Santa Barbara, California, — October 2005

Sex, Lies, and Cyberspace: The David Howard Homicide
15th Annual International ACSR Training Conference, Albuquerque, NM, February 2006
Lest We Forget: Reconstruction of the Homicide of Oklahoma State Trooper "Rocky" Eales
Annual Training Conference of the Oklahoma Division of the IAI, September 2005
14th Annual International ACSR Training Conference, San Jose, February 2005
Crime Scene Reconstruction
Oklahoma Sheriff's Association Conference, Oklahoma City, 2004
Oklahoma Chiefs of Police Association Conference, Tulsa, 2004
Make My Day: A Reconstruction of the Homicides of Mary Holt and Floyd Roberts
13th Annual International ACSR Training Conference, Oklahoma City, October 2003
2003 IABPA Training Conference, Odessa, Texas, October 2003
A Bite Out of Crime: A Home Invasion and Assault, a Reconstruction
12th Annual International ACSR Training Conference, Denver, Colorado, October 2002
2002 IABPA Training Conference, Harrisburg, Pennsylvania, October 2002.
A Three-Year-Old Hanging Death: A Reconstruction
Annual International ACSR Training Conference, Atlanta, Georgia, 2000

TRAINING INSTRUCTED

40-hour Courses

Advanced Documentation (Bloodstains & Shooting Incidents)

El Cajon, CA	March 9-13, 2020
Chandler, AZ	January 6-10, 2020
Hillsboro, OR	March 11-15, 2019
Bellevue, WA	March 4-8, 2019
Loveland, CO	January 28-February 1, 2019
Houston, TX	January 7-11, 2019
Houston Forensic Resource Center	May 2018, Sept 2018

Death Investigation

Tacoma WA	June 12-16, 2023
Chattanooga, TN	December 5-9, 2022
Minnetonka, MN	October 18-22, 2021
Nashua, NH	January 4-8, 2021
Sanford, FL	December 7-11, 2020
Chattanooga, TN	February 2-7, 2020
Houston, Tx,	April 29-May 3, 2019
Pottawattamie County, IA,	February 11-15, 2019
Houston, TX	January 14-18, 2019
Melbourne, FL	November 26-30, 2018
Fairfax County Police Department	Feb 2018

Shooting Incident Reconstruction

Richlands, WA	June 5-9, 2023
Maysville, NY	October 17-21, 2022
Chubbuck, ID	September 12-16, 2022
Nokesville, VA	April 25-29, 2022
Tacoma, WA	May 16-20, 2022
Littleton, CO	June 6-10, 2022
Clearwater, FL	December 6-10, 2021
Chubbock, ID	June 21-26, 2021
Andover, MN	May 3-7, 2021
Chattanooga, TN	April 12-16, 2021
Pueblo, CO	March 15-19, 2021
Santa Clara, CA	October 19-23, 2020
Grand Junction, CO	October 5-9, 2020
North Las Vegas, NV	January 13-17, 2020

Windsor, Ontario	October 7-11, 2019
Dover, NH	September 23-27, 2019
O'Fallon, MO	Sept 9-13, 2019
Boynton Beach, FL	June 3-7, 2019
Appleton WI	May 6-10, 2019
Johnson County, KS	April 1-5, 2019
Everette, WA	March 18-22, 2019
Edinburgh, IN	October 29-November 2, 2018
O'Fallon, MO	October 15-19. 2018
Madison, WI	June 2018
Ottawa, Ontario Canada	April 2018
Lander, WY	May 2017
Wauwatosa, WI	May 2017
New York City, NY,	May 2016
Long Beach, California,	April 2016
Madison, Wisconsin,	August 2015
Waco, Texas,	July 2015
Grand Junction, Colorado,	November 2014
Greenfield, Indiana,	August 2014
Austin, Texas	July 2014
Farmington, New Mexico	June 2014
Austin, Texas	May 2014
Pueblo, Colorado,	October 2013
Omaha, Nebraska,	June 2013
Loveland, Colorado,	August 2012
Grand Junction, Colorado,	June 2012
Norman, Oklahoma,	October 2011
Phoenix, Arizona,	October 2010
Pueblo Colorado,	July 2009

Advanced Crime Scene Reconstruction

Conroe, Texas,	June 2016
Grand Junction, Colorado,	August 2015
Fort Collins, Colorado,	August 2011
Flower Mounds, Texas,	August 2012
San Diego, California,	May 2012
Phoenix, Arizona,	September 2011
Denver, Colorado,	June 2011
Crockett, Texas,	December 2010
Norman, Oklahoma,	October 2009
Eugene, Oregon,	February 2009

Crime Scene Reconstruction

Charlotte, TN	March 20-24, 2023
O'Fallon, MO	March 13-17, 2023
Andover, MN	February 6-12, 2023
Vancouver, WA	May 23-27, 2022
Centennial, CO	January 10-14, 2022
St Louis, MO	October 14-18, 2019
Fairfax, VA	September 16-20, 2019
Madison, WI	May 13-17, 2019
Nashville, TN	April 8-12, 2019
Clearwater, FL	December 3-7, 2018
St Louis, MO	July 2018
Dover, NH	May 2018
St Louis, MO	August 2017
Beaver County, PA	March 2017

Lauderhill, Florida,	November 2016	
St Louis, Missouri,	August 2016	
Boston MA	July 2016	
San Diego, California,	June 2016	
Conroe, Texas,	February 2013,	February 2015
Austin, Texas,	July 2013	
Plano, Texas,	September 2012	
Wichita Falls, Texas,	August 2011	
Lansing, Michigan,	June 2011	
Phoenix, Arizona,	August 2011,	May 2010

Advanced Bloodstain Pattern Analysis (40 hour)

Silverton, South Africa,	July 2015
Baton Rouge, Louisiana	October 2014
Baton Rouge, Louisiana	April 2014
Midwest City, Oklahoma,	July 2013
Galveston, Texas,	January 2011
Conroe, Texas,	November 2009

Basic Bloodstain Pattern Analysis (40 hour/course)

Arlington, VA	April 17-21, 2023
Charlotte, TN	February 28 - March 4, 2022
Nashua, NH	October 4-8, 2021
Centennial, CO	June 14-18, 2021
Grand Junction, CO	March 30-April 3, 2020
St Louis, MO	October21-25, 2019
Edinburgh, IN	November 5-9, 2018
St Louis, MO	October 22-26, 2018
Alexandria, VA	June 2018
San Diego, California,	May 2016
New York City, NY,	April 2016
Denton, Texas,	February 2016
Wichita, Kansas,	November & December 2015
Silverton, South Africa,	July 2015
Denton, Texas,	April 2015
Fort Gillem, Georgia	January 2015
Baton Rouge, Louisiana	August 2014
Baton Rouge, Louisiana	February 2014
Austin, Texas,	May 2013
Amarillo, Texas,	April 2012
Houston, Texas,	March 2011
El Paso, Texas.	January 2011
Broken Arrow, Oklahoma,	April 2010
Lubbock, Texas,	January 2010
Wichita Falls, Texas.	April 2009
Grand Junction Colorado,	December 2008
Phoenix, Arizona,	November 2008

16-32 hour Courses:

Essentials of Criminal Investigations (24 hr/course)

St Louis, Missouri	August 2017
Chickasaw Lighthorse Police, Ada, OK	May 2017 and June 1017
Broken Arrow, Oklahoma,	January 2017
St Louis, Missouri	August 2016
Broken Arrow, Oklahoma,	August 2016
St Paul, Minnesota,	April 2015
Marshalltown, Iowa,	December 2014
Austin, Texas	June 2014 and July 2014

St Paul, Minnesota, June 2014
Shawnee, Oklahoma March 2014
Ada, Oklahoma, 2013

Forensic Biology (guest lecturer)
Otago University Summer School (Dunedin, New Zealand) February 2013 and January 2012

Documenting Bloodstain Pattern Evidence (32 hour)
Sirchie, Raleigh, NC, May 2011

Homicide Investigation Southern Police Institute (16 hour)
Rockford, Illinois November 2013
St Paul, Minnesota October 2013
Sioux Falls, South Dakota April 2013
Colorado Springs, June 2012
Havanna, Florida, May 2012
Cedar Rapids, Iowa, October 2011
Mundelien, Illinois, September 2011
Louisville, Kentucky, January 2013, June 2013, June 2012, February 2011

Bloodstain Pattern Analysis and Stain Selection for DNA Analysts (24 hour)
Colorado Bureau of Investigation, March 2010

Workshops

Shooting Incident Reconstruction Workshop (8 hour)
Annual ACSR Training Conference, Blackhawk, CO February 2017

Crime Scene Documentation: Scene Mapping (8 hour)
Norman Police Department, October 26, 2007

Introduction to Bloodstain Pattern Analysis (8 hour/course)
CLEET Criminal Investigation Academy
Tulsa Police Academy May 2006
McAlester, Oklahoma 2005
Lawton, Oklahoma 2004

Search Warrants: Acquisition & Execution (8 hour/course)
Sponsored by Federal Bureau of Investigation and Oklahoma State Bureau of Investigation
Hugo, Oklahoma November 2005
Poteau, Oklahoma November 2001

Crime Scene Reconstruction (8 hour)
Federal Bureau of Investigation and Bureau of Indian Affairs, Phoenix, AZ January 2004

Major Crime, Securing the Scene and Crime Scene Processing (8 hour)
Tribal/BIA Uniformed Police Officer In-Service Training Program, July 1996

Crime Scene Processing/Evidence Collection (8 hour)
C.L.E.E.T. Basic Academy, 1993

Bloodstain Pattern Recognition Workshop (4 hour/conf)
IAI 103rd International Training Conference, San Antonio, TX July 2018
IAI 102nd International Training Conference, Atlanta, GA Aug 2017
IAI 98th International Training Conference, Providence Rhode Island
IAI 97th International Training Conference, Phoenix, Arizona, July 2012
IAI 96th International Training Conference, Milwaukee, Wisconsin, August, 2011
IAI 95th International Training Conference, Spokane, Washington, July 2010
IAI 94th International Training Conference, Tampa, Florida, August 2009
IAI 93rd International Training Conference, Louisville, Kentucky, July 2008
IAI 92nd International Training Conference, San Diego, California, July 2007

Bloodstain Reconstruction Workshop (4 hr)
Annual ACSR Training Conference, Nashville, TN February 2019
2018 IABPA Annual Training Conference, Ottawa, Ontario Oct 2018
IAI 103rd International Training Conference, San Antonio, TX July 2018

Trajectory Analysis Workshop (4 hr/course)
Northeast Division of the IAI Dec 2017
Bloodstain Pattern Identification Workshop (4 hr/course)
Northeast Division of the IAI Dec 2017
Posing the Scene: Forensic Animation Workshops (4 hour/conf)
2015 ACSR Annual Training Conference
2011 IAI 96th International Training Conference, Milwaukee, Wisconsin
2010 European IABPA Conference, Lisbon, Portugal
2009 IABPA Conference, Portland, Oregon
2009 18th Annual International ACSR Training Conference, Tulsa, Oklahoma
2008 17th Annual International ACSR Training Conference, Tulsa, Oklahoma
Bloody Bones and Butcher Knives: Bloodstain Pattern Recognition (4 hour)
Annual Training Conference of the Oklahoma Division of the IAI September 2005
Crime Scene Documentation Workshop: Measurements to Courtroom Exhibits (4 hour)
Oklahoma Division of the IAI Annual Training Conference, Edmond, Oklahoma, September 2005
Evidence Collection and Preservation Workshop (4 hour)
Oklahoma Division of the IAI Annual Training Conference, Edmond, Oklahoma September 2005
Building a Case Presentation: PowerPoint for Courtroom Presentation Workshop (4 hour)
14th Annual International ACSR Training Conference, San Jose, February 2005
Crime Scene Diagramming (4 hour)
OSBI Academy, September 2002
After the Report: Bloodstain Models for Training and Testimony (2 hour/conf)
IAI 98th International Training Conference, Providence Rhode Island
IAI 94th International Training Conference, Tampa, Florida, August 2009
Animations in Reconstruction (2 hour/course)
Advanced Crime Scene Reconstruction, sponsored by TBI, LLC
Norman, Oklahoma, 2008
Norman, Oklahoma, 2007
Norman, Oklahoma, 2005

SPECIALIZED TRAINING ATTENDED

Fluid Dynamics of Bloodstain Pattern Formation, Pontoise, France June 2019 (40 Hrs)
International Association of Identification, Annual Conference, August, 2016
Trajectories, Rods and lasers (4 hrs)
Bloodstains on Fabrics and the use of an ALS (3 hrs)
Analysis of Complex patterns and BPA scenarios (4 hrs)
Applying Bloodstain Pattern Analysis Methodology to Casework (3 hrs)
Distinguishing Human from Non-Human Skeletal Remains (3 hrs)
Examination of Bloodstains and Bloodstain Patterns on Clothing (4.5 hrs)
The Basics of Bone Trauma
Wipes, Swipes and Transfer Impressions
Recognizing Voids and How To Use Them In Bloodstain Pattern Analysis
Criminal Profiling from an Investigator's Perspective
Bloodstain Symposium, Midwest Forensic Science Center, August 2010 20 hours
IABPA European Training Conference 24 hours/year
2006, 2008, 2010, 2019
IABPA Annual Training Conferences 24 hours/year
1992, 1994, 1995, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2015, 2017, 2018
ACSR Annual Training Conference
1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003,

2004, 2005, 2006, 207, 2008, 2009, 2010, 2011, 2015, 2016, 2017, 2019, 2020

Bloodstain Pattern Analysis Level III 50 hours
Henderson Forensics, instructor Bob Henderson, Canyon, Texas November 2005

Forensic Shooting Scene Reconstruction 40 hours
Instructors Joe Foster and Mike Haag, Los Lumas, New Mexico June 2004

Homicide Investigations 80 hours/course
Southern Police Institute/OSBI Oklahoma City September 2002
Southern Police Institute/OSBI, Oklahoma City May 1991

OSBI 12th Investigative Academy, Oklahoma City February 2002

Microscopic Hair Analysis OSBI, Oklahoma City, January 2000 40 hours

Crime Scene Reconstruction
Oklahoma City, 1994 16 hours
Oklahoma City, 1993 16 hours

Oklahoma Sheriff's and Peace Officer's Association (OSPOA), 1995 4 hours

Biochemistry East Central University, Ada, Oklahoma, 1998

Photography OSBI, December 1997

Advanced Bloodstain Pattern Analysis 40 hours
Kansas Bureau of Investigation, October 1996

Basic Molecular Biology University of Oklahoma, 1995

DNA Analysis
OSBI & District Attorney's Council, Fort Worth, November 1995 16 hours

Forensic PCR Amplification & Typing
OSBI and Perkin-Elmer, November 1995 54 hours

DNA: Proving the Truth OSBI 1995 16 hours

Oklahoma Women in Law Enforcement Training Conference, 1995 8 hours

Forensic Pathology OSBI, 1994 4 hours

Investigations of Crime: Crime Scenes, Computers, and Children, 20 hours
Center for Medicolegal Research, Albuquerque, New Mexico May 1994

Child Sexual Abuse, Infant & Child Fatalities 16 hours
Oklahoma Department of Health, 1994

Southwestern Association of Forensic Science/Southern Association of Forensic Science Joint Conference
Little Rock, AR, 1994 24 hours
Crime Scene Photography, SWAFS 1994 4 hours
Shreveport, Louisiana, 1992 24 hours
Advanced Crime Scene Processing 8 hours

Investigating Child Fatalities Tulsa, 1994 16 hours

Forensic Serology FBI, Quantico, Virginia, June 1993 40 hours

CLEET Criminal Investigation Academy 124 hours
Wilburton, Oklahoma. February-March 1993

Southwestern Association of Forensic Science/Southern Association of Forensic Science Joint Conference, Shreveport, LA, 1992
Advanced Crime Scene Processing 8 hours
Basic Serology, SWAFS 1992 8 hours

Southwestern Association of Forensic Science Annual Training Conference 1991 16 hours

Advanced Bloodstain Pattern Analysis 40 hours
OSBI, Oklahoma City, January 1992

Semi-Automatic Pistol Transition School, Oklahoma Highway Patrol, 1992 24 hours

OSBI 9th Academy	Oklahoma City, 1991	300 hours
Basic Bloodstain Pattern Analysis	OSBI, Oklahoma City, April 1991	40 hours
Luminol, OSBI 1991		16 hours
CLEET Basic Academy, Broken Arrow, Oklahoma, 1989		300 hours

MEDIA

48 Hours: *Death Hits Home*	2022
Forensics: You Decide: *Blood Brothers*	
Investigation Discovery, a Sirens Media production,	2009
Swift Justice with Nancy Grace CBS Studios, Inc.,	2010

PUBLICATION

Developing and Using Demonstrative Exhibits in Support of the Crime Scene Analysis
Practical Crime Scene Analysis and Reconstruction, CRC Press, Boca Raton, Florida, p. 249-271

AWARDS

Oklahoma Division of the IAI Lifetime Membership	2016
Distinguished Fellow of the ASCR	2011
Fellow of the ACSR	2003
Oklahoma State Bureau of Investigation Criminalist of the Year	1995

EXHIBIT F

RE: United States Civil Action No. 3:22-CV-02714-K

SCENE RECONSTRUCTION ANALYSIS REPORT

Iris Dalley

Graff Investigative & Forensic Training

GRAFF Investigative & Forensic Training

Re: United States Civil Action No. 3:22-CV-02714-K
Estate of Nehemias R. Pivaral Santos v. Caylee Erin Smith and Eastman Chemical Company

An analysis and reconstruction were conducted to determine the sequence of actions that occurred in the death of Nehemias R. Pivaral Santos. This analysis used a structured methodology of bloodstain pattern analysis and scene reconstruction. Bloodstain pattern[1] analysis is the application of fluid dynamics as it relates to bloodstain characteristics, accomplished by in-depth examination of documentation such as images. Reconstruction identifies relationships between various types of evidence in the context of the scene to identify actions that occurred to produce the evidence, to sequence those actions, and to include or exclude scenarios consistent with the evidence.

The analyst's opinions are based on the analyst's experience, education, and training. The explained events are based on the available evidence. The analyst will consider additional evidence that becomes available, and the analyst may revise portions of the analysis based on the relevance of additional evidence.

The following information was provided to the analyst:

- Richland PD Photos – 3 pdf documents containing 57 scene images.
- TX DPS Photos – 43 jpg files (DSC_0001 thru DSC_0033 and IMG_1397 thru IMG_1406)
- Bodycam Richland PD Corp. Winston mp4 video files RPD003_8L005577_160346, RPD003_8L005577_161348, RPD003_8L005577_162348, and RPD003_8L005577_164348
- TX DPS Troop. Sherman video file JosephSherman_20220430_03_59_WFC1-067751_Traffic Crash_188473525.ts
- Richland Police Department Incident Report #2200089
- Richland PD Caylee Smith Statement
- Richland PD Evelyn Moreno Statement
- Texas Department of Transportation Peace Officer's Crash Report 2200089
- State of Texas Certificate of Death Nehemias R Pivaral Santos
- Excerpt of Deposition of Caylee Erin Smith, August 8, 2023
- Excerpt of Deposition Evelyn Moreno, August 2, 2023
- Excerpt of Deposition Erick Jeremias Pivaral Santos, August 1, 2023
- Excerpt of Deposition Melvin Alexander Diaz Fuentes, August 2, 2023

HISTORY[2]

On April 30, 2022, Richland police were dispatched to a reported traffic accident with fatality. The scene location was "near the 223-224 North Interstate 45"[3]. Reports at the scene indicated

[1] A bloodstain pattern is one or more related bloodstains created by a single action.
[2] Richland Police Department Incident Report #2200089.
[3] Ibid p2

Nehemias Santos and Evelyn Morena were outside their 2011 Toyota Camry, parked partially in the roadway, when Nehemias was struck by a passing vehicle driven by Caylee Smith.

SCENE

The scene was the left northbound lane of Interstate 45 about 1 mile south of Exit 225.[4] *Figure 1.* A black 2011 Toyota Camry was parked astride the left boundary of the northbound lane. The trunk lid was fully open. A tire was standing against the left barrier near the left front of the Camry. *Figure 2.*[5]

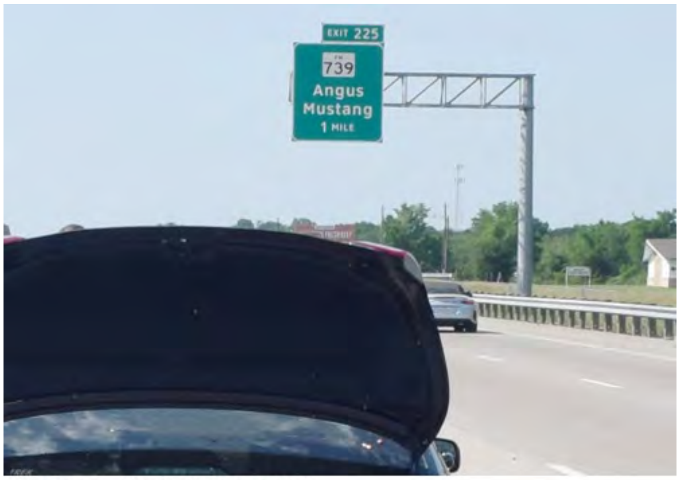


FIGURE 1. TX DPS DSC_0014

FIGURE 2. Richland PD Photos 2200089 - Photos_Part2_17

Nehemias Santos' body was lying supine on the pavement behind the Camry. His head was to the west and his legs to the east. Nehemias was dressed in a dark short-sleeved shirt, dark long pants, and dark socks. A light-colored cloth was against the right side of Nehemias' head. *Figure 3.*

[4] Satellite view of google.com/maps for I-45 Exit 225 area was used as the base of the scene model.

[5] Richland Police Department Incident Report #2200089 p.2, the family covered the body after Richland PD Officer Winston's arrival.

FIGURE 3. Bodycam RPD003_8L00577_160346 00.04

A wide path of blood/fluid staining was on the pavement approximately parallel to Nehemias Santos' left side and extended to the east side of the northbound lane, east of the Camry. Apparent body tissue[6] and debris of varying sizes was on the pavement and Camry. A drag-like mark on the pavement extended from Nehemias Santos' right foot to the east end of the blood/fluid staining.

The cause of death was reported as blunt force trauma[7]. No medical evaluation of Nehemias Santos' injuries were provided to the analyst. Bloodstains near the head and the tissue debris indicated open head trauma. The right leg appeared bent in an unnatural position, possibly indicative of a broken leg.[8]

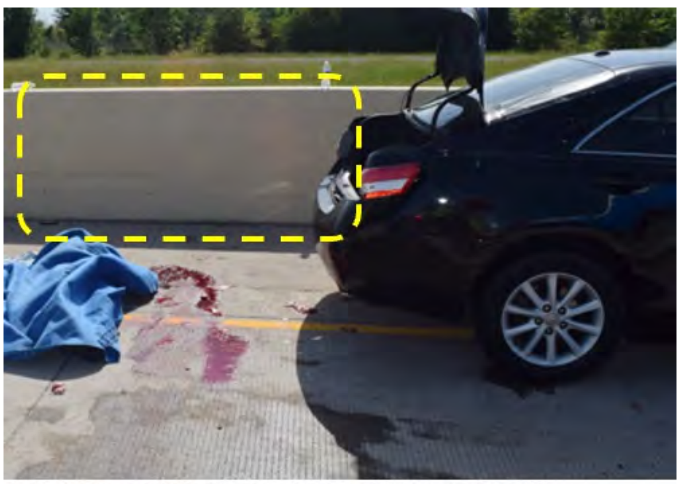


FIGURE 4. TX DPS DSC_0012 Bloodstains on barrier.

FIGURE 5. TX DPS DSC_0012
Circular and elliptical bloodstains on barrier.

A pattern of circular and elliptical bloodstains was on the east side of the center concrete barrier west of the body and rear portion of the Camry. *Figure 4.* The bloodstains were mostly circular[9], indicating the blood drops were moving east-to-west, approximately perpendicular to the

[6] For purposes of this report "tissue" refers to masses that appear to be comprised of cerebral material, body fat, and body fluid.

[7] State of Texas Certificate of Death Nehemias R. Pivaral Santos

[8] Richland Police Department Incident Report #2200089 p.2 stated the "right leg was obviously broken" without explanation. The body was only documented by the Richland PD bodycam from a distant obtuse angle for about 6 seconds.

[9] Blood in flight forms spherical drops that produce circular to elliptical stains. The shape of individual stains is related to the angle of impact to the target surface. The direction of flight can be determined by the direction of the movement of blood after impact, or the 'tails' of the stain.

barrier. The overall distribution of stains radiated slightly to the south with no void areas within the broad pattern on the barrier.[10] No obstacles were between the blood source and the barrier pattern area. *Figure 5 and Figure 6.* The pattern on the barrier continued west of the open Camry trunk. *Figure 7.*

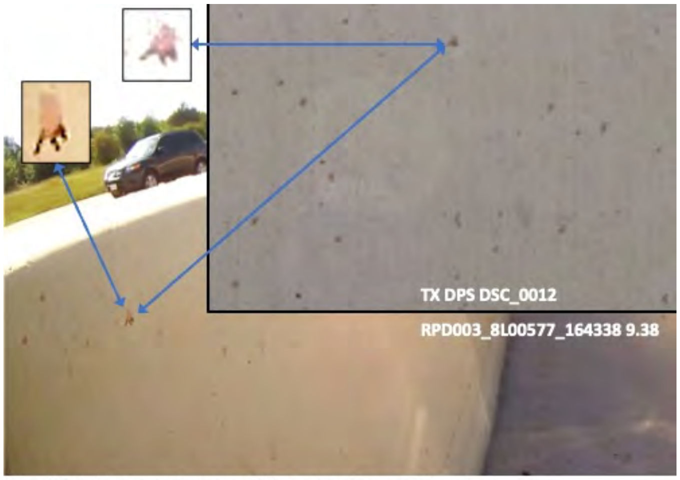


FIGURE 6. Two views of bloodstains on barrier.

FIGURE 7. TX DPS DSC_0023. Blood on barrier west of car.

Elliptical stains, some with associated flow, were along the west side of the Camry, from the trunk opening downward. Directionality of these stains was east-to-west. Blood could be seen in some of those stains. Elliptical stains and tissue debris were across rear window. *Figure 8.* The shape and location of these stains indicated a source east of the trunk.

FIGURE 8. TX DPS DSC_0017. Stains on west side of Camry.

FIGURE 9. TX DPS DSC_0023. Stains on rear of Camry.

[10] Void in a bloodstain pattern occurs when a portion of a pattern is removed. For example, if an obstacle had obstructed the path of the blood to the barrier, then the pattern would have an absence of blood within the pattern area that reflected the obstacle shape. That portion of the bloodstain pattern would be on the obstacle's surface.

Elliptical bloodstains were on the vertical surface of the left rear taillight housing. The outline of blood stains originated from a source east of the taillight housing and were travelling downward when they contacted the taillight housing[11]. *Figure 9.*

Tissue debris, consistent with cerebral matter, was concentrated around the east side of the rear bumper, east edges of the trunk, and across the rear glass. *Figure 10.* Similar debris was notably absent from the trunk interior.[12] *Figure 11.*

FIGURE 10. TX DPS DSC_0017. Tissue debris around trunk.

Tissue debris marked.

FIGURE 11. TX DPS DSC_00. Rear of Camry.

Tissue masses were on the pavement below the right side of the Camry and forward of the right rear tire. *Figure 12.*

FIGURE 12. TX DPS DSC_0023. Rear of Camry.

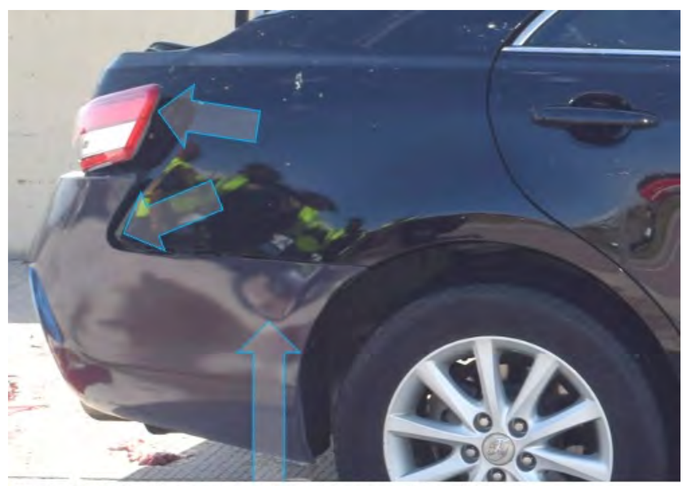


FIGURE 13. TX DPS DSC_0011. Right side of Camry.

The right rear taillight lens cover was broken. Pieces of the lens cover were on the pavement behind the Camry and east of the Camry. *Figure 12.* The right end of the rear bumper had a

[11] Blood drop flights are parabolic. At some point gravity will cause the flight path to turn downward.
[12] TX DPS DSC_0023 trunk interior trunk color adjusted to enhance view.

downward and backward depression. The bumper was separated from the right rear quarter panel at the back end of the quarter panel. The right side of the taillight assembly was dislocated backward. *Figure 13.*

Tissue spatter was dispersed across the right side of the Camry from the rear to the right front window, and across the right roof of the Camry. One tissue mass was adhered to the back edge of the rear side window frame (yellow outlined arrow in figure). *Figure 14.* This dispersion pattern was consistent with a source south and east of the Camry right side.

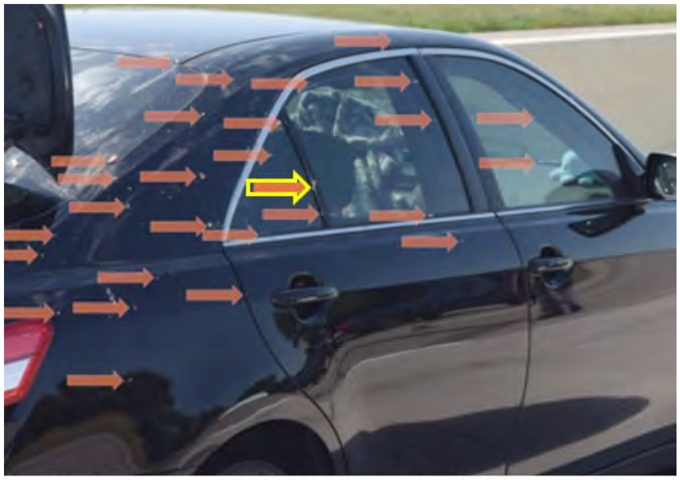


FIGURE 14. TX DPS DSC_0023. Right side of Camry.

A white 2021 Ford Explorer was parked in the left emergency lane north of the Camry.[13] The left front headlight was broken. The top front of the left quarter panel was bent backward, exposing the left front side of the engine compartment. *Figure 15.*

FIGURE 15. TX DPS IMG_1406 Ford Explorer.

FIGURE 16. TX DPS IMG_1406 Ford Explorer.

[13] Richland Police Department Incident Report #2200089 p.2 and bodycam video RPD003_8L00577_162348 0.335

Circular and elliptical bloodstains were inside the defect area[14]. *Figure 16.* Elliptical stains[15] were on the bent metal and above the right front tire. Swipe-like bloodstains were along the left side rear door. The left front fender trim was separated from the fender. The front of the left rear fender trim was dislodged. *Figure 17.*

FIGURE 17. Richland PD 2200089 - Photos_Part1_9

FIGURE 18. TX DPS IMG_1405 Ford Explorer.

The driver's side mirror was not damaged. *Figure 18.* Nehemias Santos was not struck by the Explorer side mirror.

No bloodstains, dents or pressure marks were on the Explorer hood, indicating that Nehemias Santos was not carried forward on the Explorer hood.

FIGURE 19. Approximation of Nehemias Santos' posture.

In the context of this scene, if the Explorer damage was caused by an impact with Nehemias Santos' head, then Nehemias Santos' head was lowered to the level of the Explorer headlight.[16] The exact posture cannot be determined but requires flexing of the lower joints (hips and/or knees). The posture depicted is an approximation to lower the head to the impact level. *Figure 19.*

---

[14] The volume in stains within the defect area was consistent with a projected pattern, such as a breached artery.
[15] Elliptical bloodstains immediately behind the metal defect appear to be a complex pattern of impact spatter and projected blood. A complex bloodstain pattern occurs when bloodstain patterns overlap.
[16] Vehicles in scene model dimensioned to manufacturer's specifications. Generic male model for demonstrative purposes only.

At impact, an opening was created behind the Explorer's left headlight, and blood was projected into the engine compartment. *Figure 16.*

The impact spattered blood from Nehemias Santos to the east side of the barrier. *Figures 4-8.* The bloodstain impact spatter pattern[17] extended north of the back end of the Camry.
No physical contact between the two vehicles was evidenced. Therefore, the initial impact occurred east of the Camry right rear, in the northbound driving lane, near the Camry right rear. *Figure 20, Figure 21.*

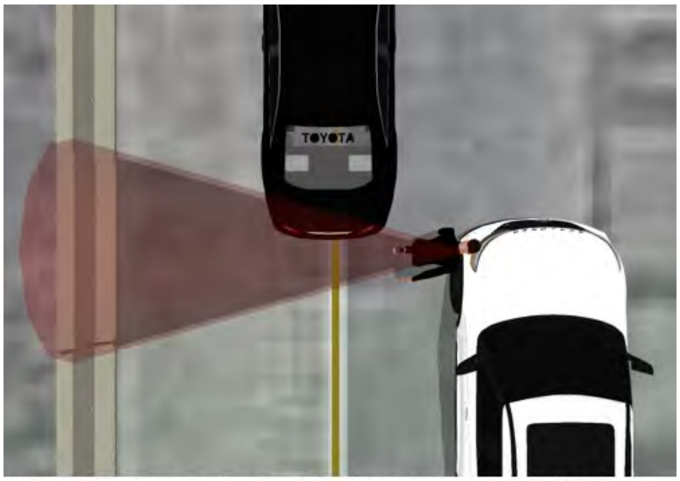


FIGURE 20. Cone indicating blood impact spatter to barrier.

FIGURE 21. Cone indicating blood impact spatter to barrier.

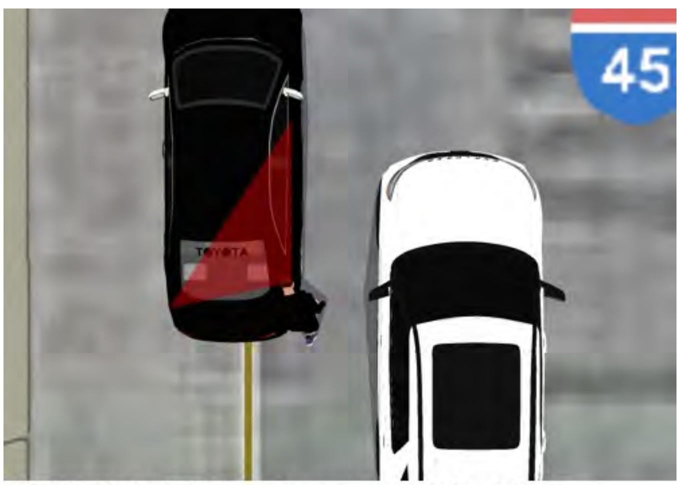


FIGURE 22. Body hit Camry, cone area of blood/tissue.

Blood was swiped from a bloodied surface to the Explorer above the left front tire.

Nehemias Santos impacted the area of the Camry right-side bumper, displacing the bumper and breaking the taillight lens cover. This impact ejected blood and tissue across the trunk, rear window, roof, and right side of the Camry. *Figures 9-15, Figure 22.*

Nehemias Santos body moved, or rebounded, from the Camry to the left side of the Explorer such that his body was in hard contact with the left side of the Explorer as the Explorer continued moving north. This

[17] A bloodstain impact pattern occurs when a force is applied to a blood source. Blood is propelled from the source in an approximate cone area from the source to the target surface, creating a radiating distribution of circular to elliptical stains. With sufficient documentation the area of origin of the bloodstains can be calculated to identify the approximate location of the blood source. In this case, the source can be approximated by the overall barrier pattern and its relationship to other evidence in the scene.

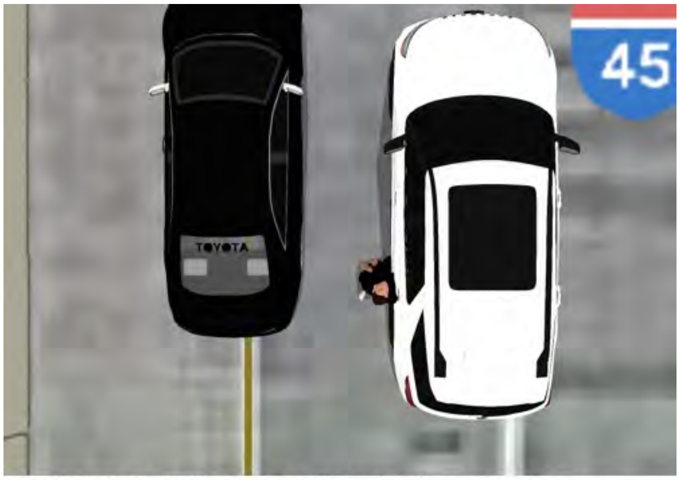


FIGURE 23. Body hit Explorer, blood swipe on Explorer.

contact created blood swipes[18] along the left side of the Explorer, along the left rear door. The movement of the Explorer against Nehemias Santos body displaced the front trim of the left rear fender. *Figure 17, Figure 23.*

Nehemias Santos' body fell to the pavement in the northbound traffic lane. A pool of blood on the pavement was consistent with originating from Nehemias Santos' head trauma. *Figure 24, Figure 25.*

FIGURE 24. TX DPS DSC_0011. Blood pool on roadway.

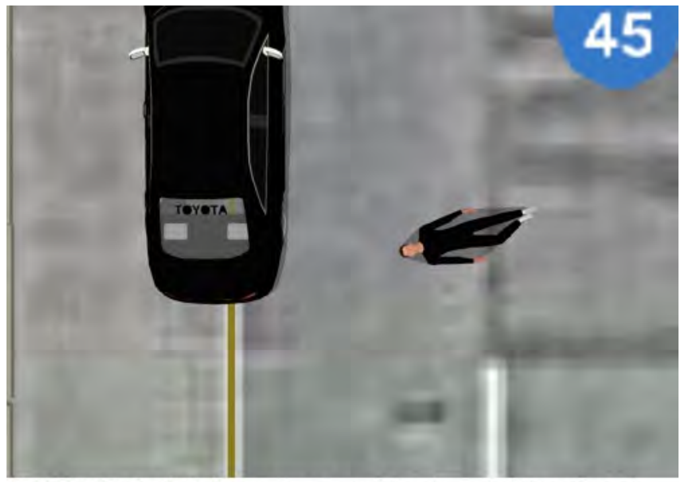


FIGURE 25. Body fell to pavement, blood pooled from head.

FIGURE 26. Body dragged behind Camry.

[18] Blood swipe stains occur when a bloodied object moves against a surface, leaving a portion of the blood on that surface.

Some person(s) dragged Nehemias Santos' body from the roadway to the pavement behind the Camry.[19] *Figure 26.*

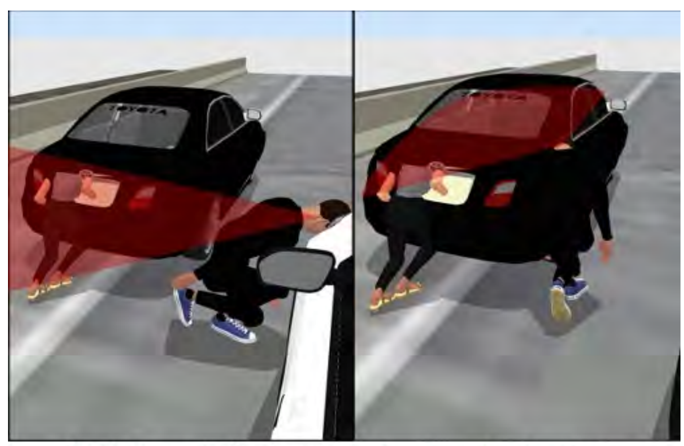
FIGURE 27. RPD003_8L00577_164348 8.38.

Evelyn Moreno, Erick Pivaral, Melvin Diaz, and Dina Regalado were at the scene.[20] *Figure 27-28.*

Bodycam images of Evelyn Moreno showed that she had blood spatter and tissue spatter on her right arm and on her right side. *Figure 28.* Evelyn Moreno's right side was exposed to blood and tissue as it traveled through the air from the source to her. In the context of the scene, an area of possible spatter void was identified in the Camry trunk. Moreno could have been positioned behind the Camry at the left side of the trunk, leaning into the trunk, when the impact occurred. *Figure 29.*

Blood and tissue spatter on Moreno's right arm and right side.

FIGURE 28. Bodycam images of Evelyn Moreno at scene.



Shaded area indicating approximate path of spatter.

FIGURE 29. Scenarios with Moreno in Camry trunk at impact.

[19] The position of the body on the pavement behind the Camry suggests he may have been dragged by his right arm, causing his left arm and legs to be extended. Then his right arm was placed across his body.
[20] Richland Police Department Incident Report #2200089.

FIGURE 30. Bodycam images of Eric Pivaral at scene.

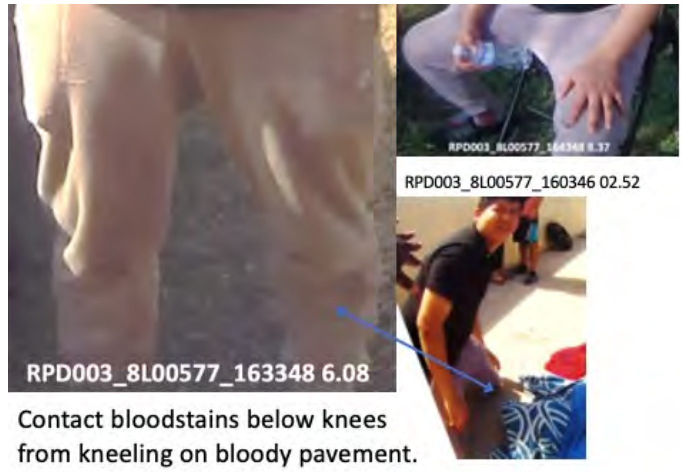


FIGURE 31. Bodycam images of Eric Pivaral at scene.

Bodycam images of Erick Pivaral showed no indications of bloodspatter or tissue debris on his shirt, arms, or pants.[21] *Figure 30, Figure 31.* Erick Pivaral was not in the path of blood and tissue spatter at impact. Erick Pivaral was not standing at the Camry trunk or east of the barrier bloodstain pattern area at the time of impact.

FIGURE 32. Bodycam images of Melvin Diaz at scene.

FIGURE 33. Bodycam images of Dina Regalado at scene.

Bodycam images of Melvin Diaz showed no indications of bloodspatter or tissue debris on his shirt or arms. *Figure 32.* Melvin Diaz was not in the path of blood and tissue spatter at impact. Melvin Diaz was not standing at the Camry trunk or east of the barrier bloodstain pattern area at the time of impact.

[21] A possible transfer stain was on Erick Pivaral's left lower pant leg, below the left knee. This pattern could occur from kneeling on the stained pavement as depicted in the bodycam video RPD003_8L00577_160346 02.52. This stain is not consistent with being in the path of blood in flight such as the impact pattern on the barrier.

Bodycam images of Dina Regalado showed no indications of bloodspatter or tissue debris on her shirt or arms. *Figure 33.* Dina Regalado was not in the path of blood and tissue spatter at impact. Dina Regalado was not standing at the Camry trunk or east of the barrier bloodstain pattern area at the time of impact.

CONCLUSIONS

Based on analysis of the documents, images, and video, the following sequence of actions was identified:

Nehemias Santos was in the left northbound traffic lane, near the right rear of the Camry and east of the Camry, when he was struck by the front left of the Explorer which was travelling in the northbound travel lane.

The force of impact with the Explorer caused blood to be projected from Nehemias Santos to the center barrier, creating a large spatter pattern on the barrier. No intervening objects or persons were in the path of the blood as it travelled from Nehemias Santos to the barrier.

The force of impact with the Explorer propelled Nehemias Santos' body against the right side of the Camry rear bumper, damaging the right taillight and bumper, and projecting blood and tissue from Nehemias Santos across the Camry open trunk and right side.

Nehemias Santos' body rebounded from the rear of the Camry and came in hard contact with the Explorer left side, leaving blood swipes on the Explorer left rear door and dislodging the front section of the left rear fender trim.

Nehemias Santos' body fell to the pavement east of the Camry, in the northbound traffic lane. Blood from Nehemias Santos' head trauma pooled on the pavement.

During these events, Evelyn Moreno was behind the Camry at the left side of the open trunk. Nehemias Santos' blood and tissue struck Evelyn Moreno's right side.

Someone dragged Nehemias Santos' body from the northbound traffic land to the pavement behind the Camry.

Respectfully submitted,

Iris Dalley Graff
28 September 2023

Reviewed by Gary Graff.

FIGURE 1. TX DPS DSC_0014

FIGURE 2. Richland PD Photos 2200089 - Photos_Part2_17

00476.118002337

FIGURE 3. Bodycam RPD003_8L00577_160346 00.04

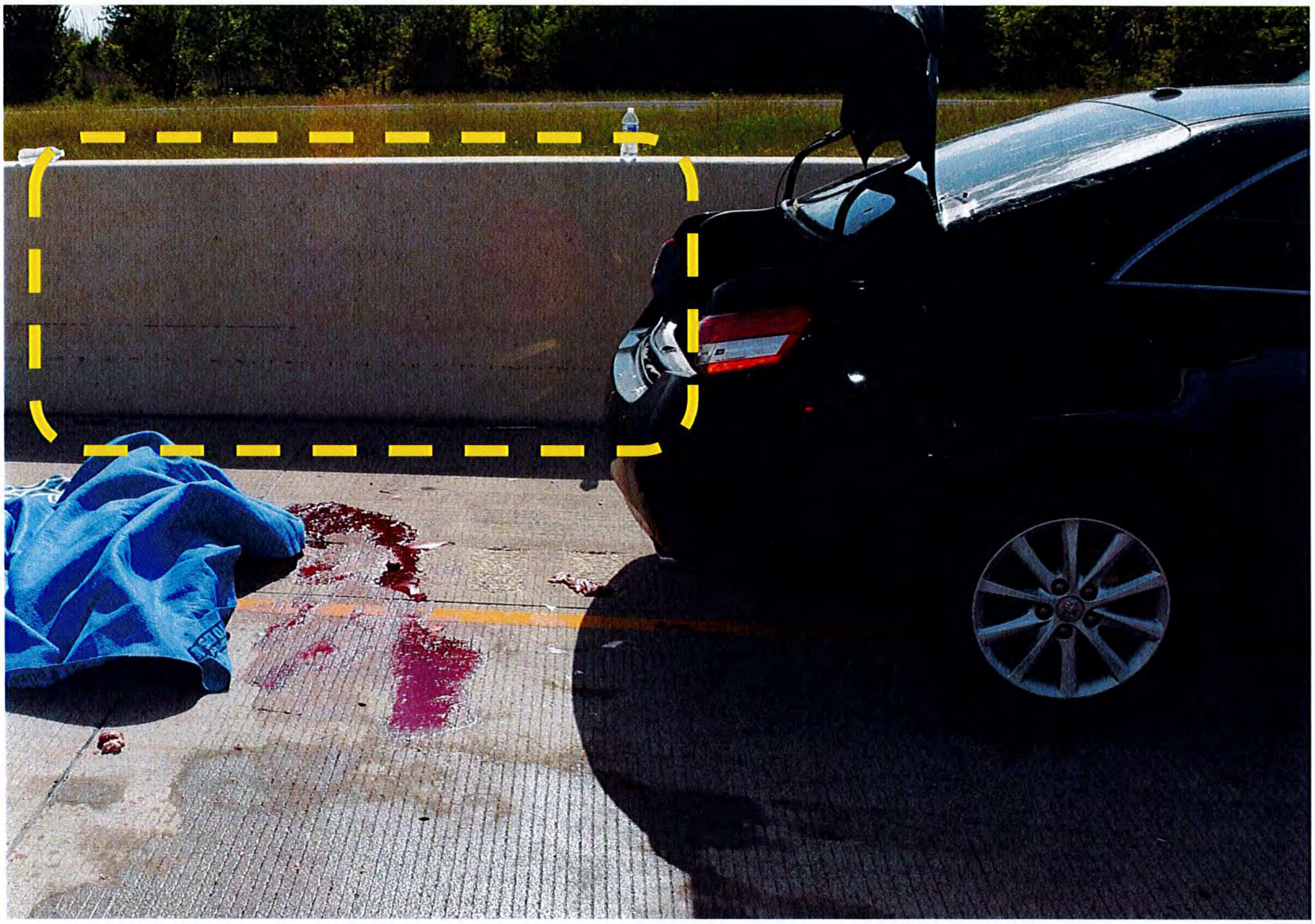


FIGURE 4. TX DPS DSC_0012 Bloodstains on barrier.

FIGURE 5. TX DPS DSC_0012
Circular and elliptical bloodstains on barrier.

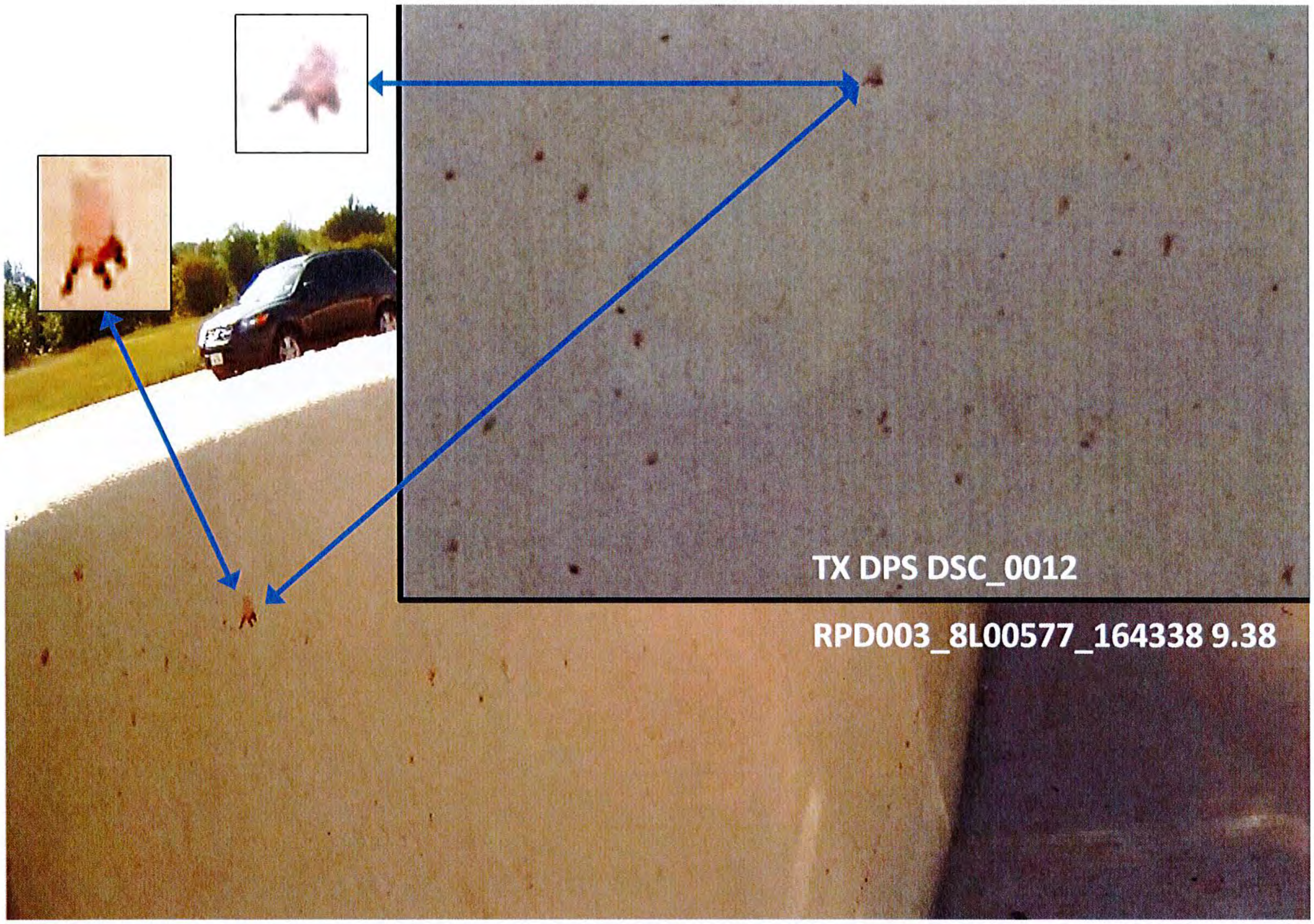


FIGURE 6. Two views of bloodstains on barrier.

FIGURE 7. TX DPS DSC_0023. Blood on barrier west of car.

FIGURE 8. TX DPS DSC_0017. Stains on west side of Camry.

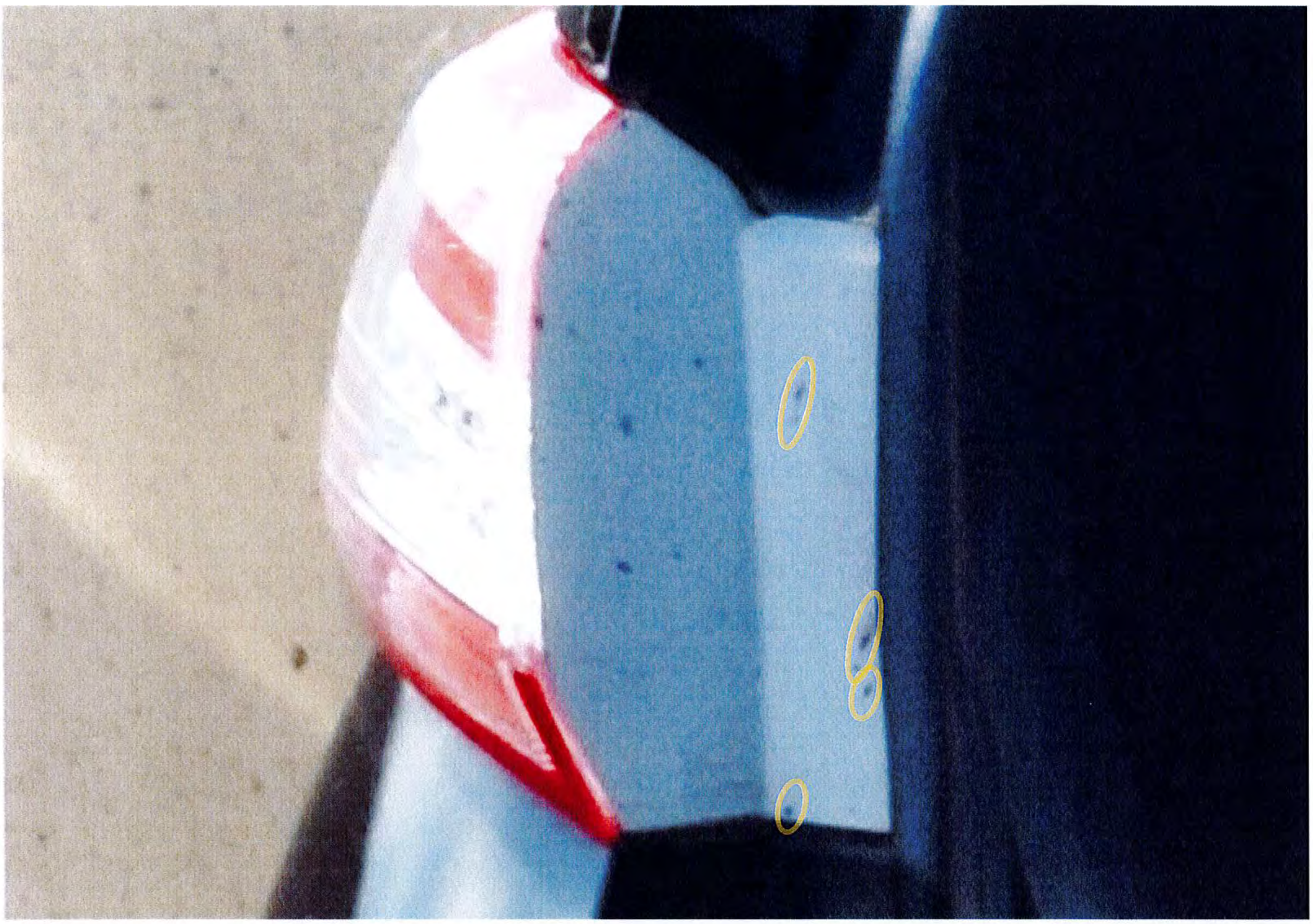


FIGURE 9. TX DPS DSC_0023. Stains on rear of Camry.

FIGURE 10. TX DPS DSC_0017. Tissue debris around trunk.

Tissue debris marked.

FIGURE 11. TX DPS DSC_00. Rear of Camry.

FIGURE 12. TX DPS DSC_0023. Rear of Camry.

FIGURE 13. TX DPS DSC_0011. Right side of Camry.

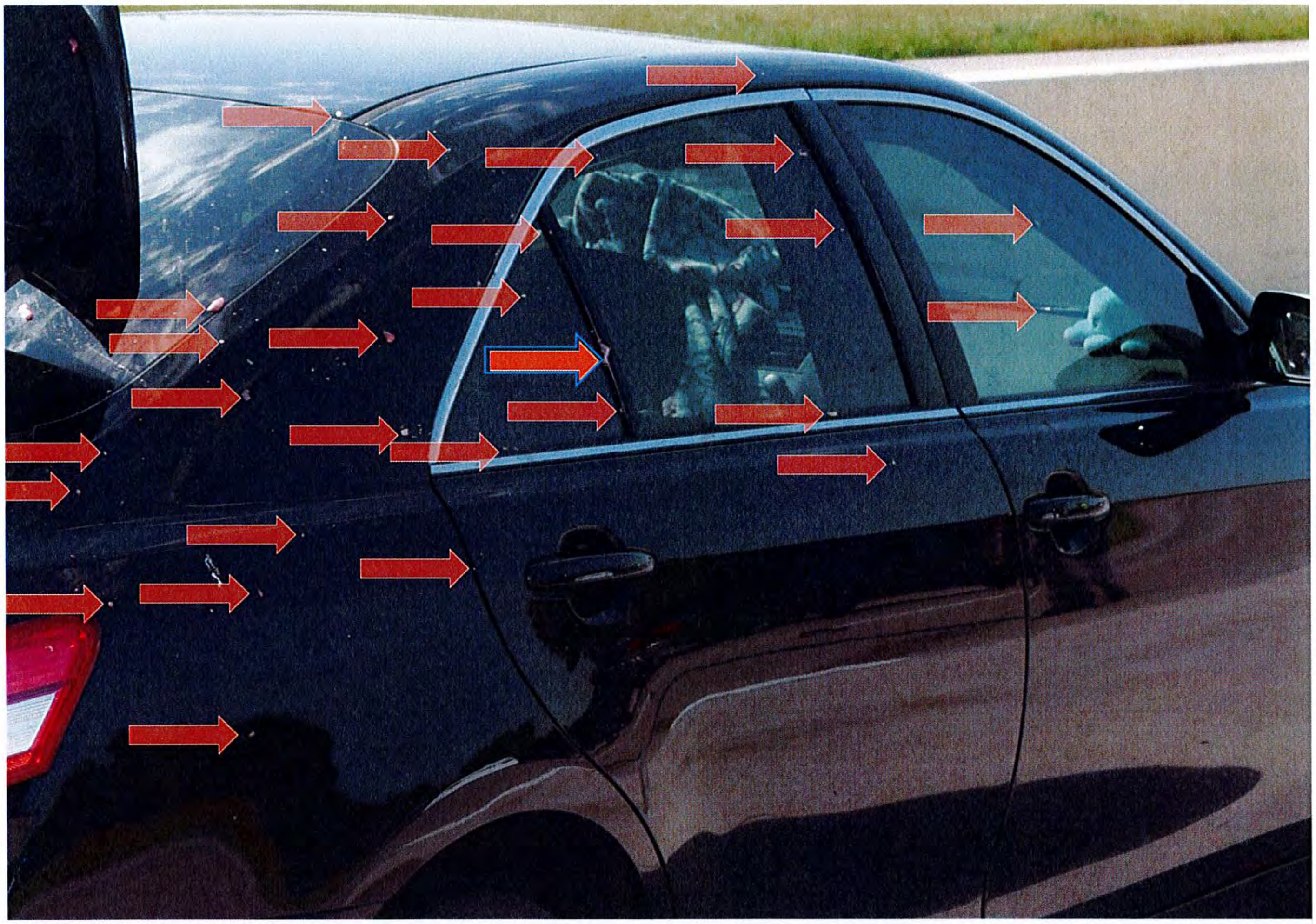


FIGURE 14. TX DPS DSC_0023. Right side of Camry.

FIGURE 15. TX DPS IMG_1406 Ford Explorer.

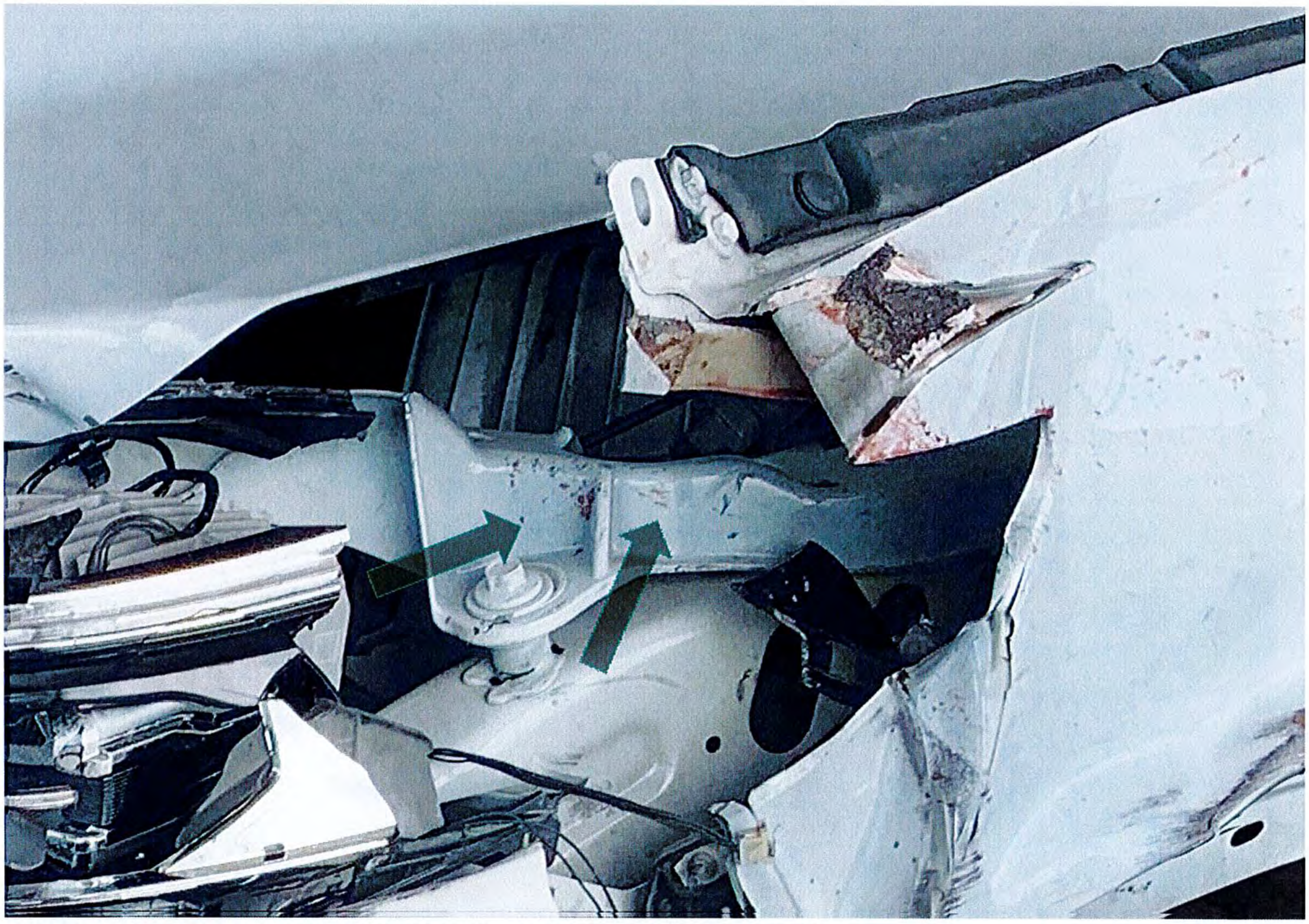


FIGURE 16. TX DPS IMG_1406 Ford Explorer.

FIGURE 17. Richland PD 2200089 - Photos_Part1_9

00476.118002352

FIGURE 18. TX DPS IMG_1405 Ford Explorer.

FIGURE 19. Approximation of Nehemias Santos' posture.

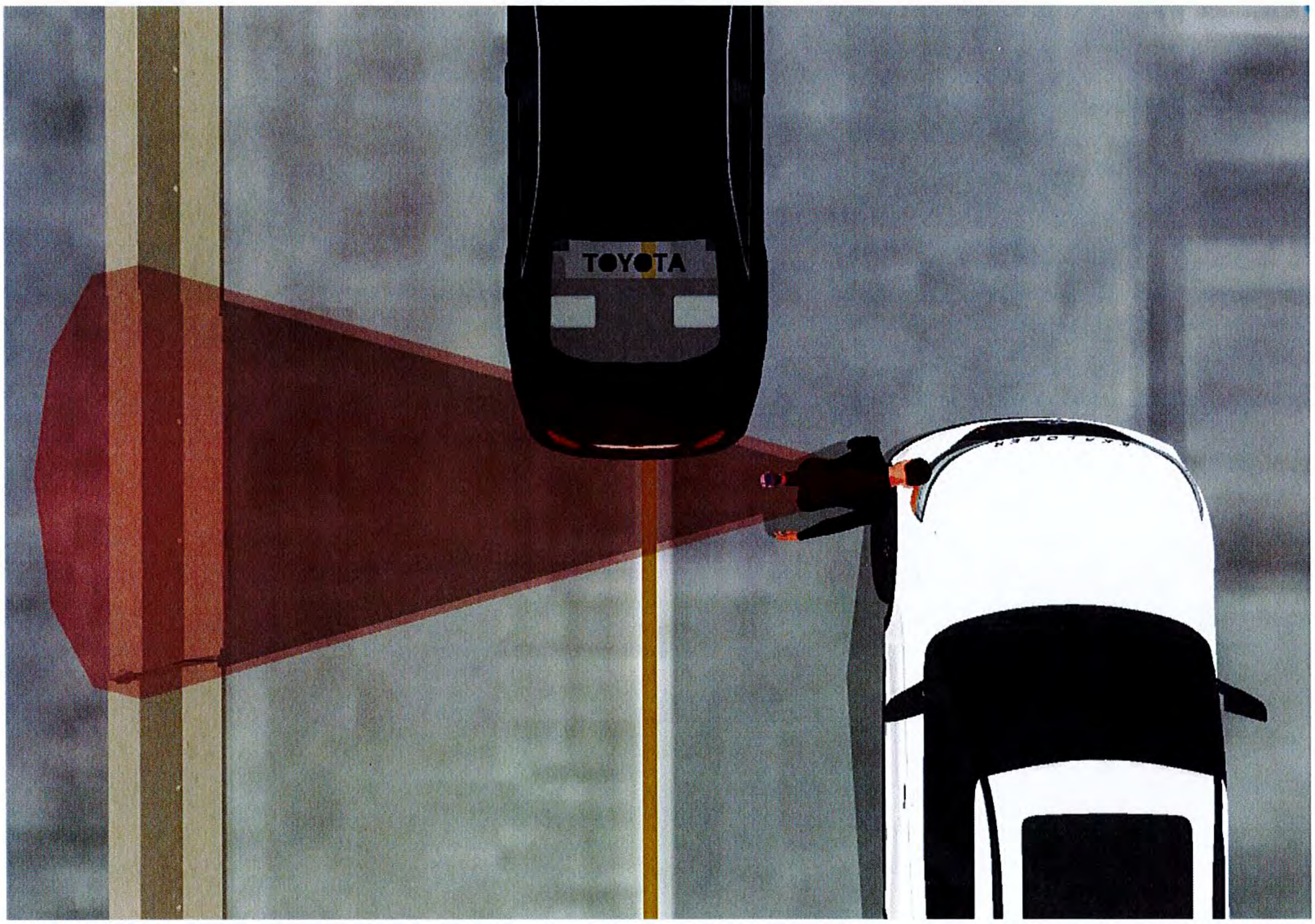
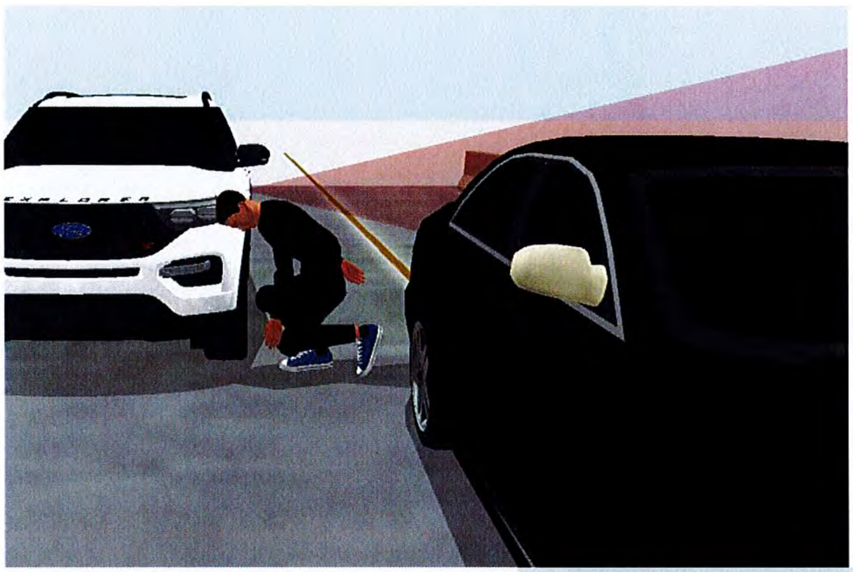


FIGURE 20. Cone indicating blood impact spatter to barrier.



Blood drops travelled unobstructed from impact site to east side of center barrier.

FIGURE 21. Cone indicating blood impact spatter to barrier.

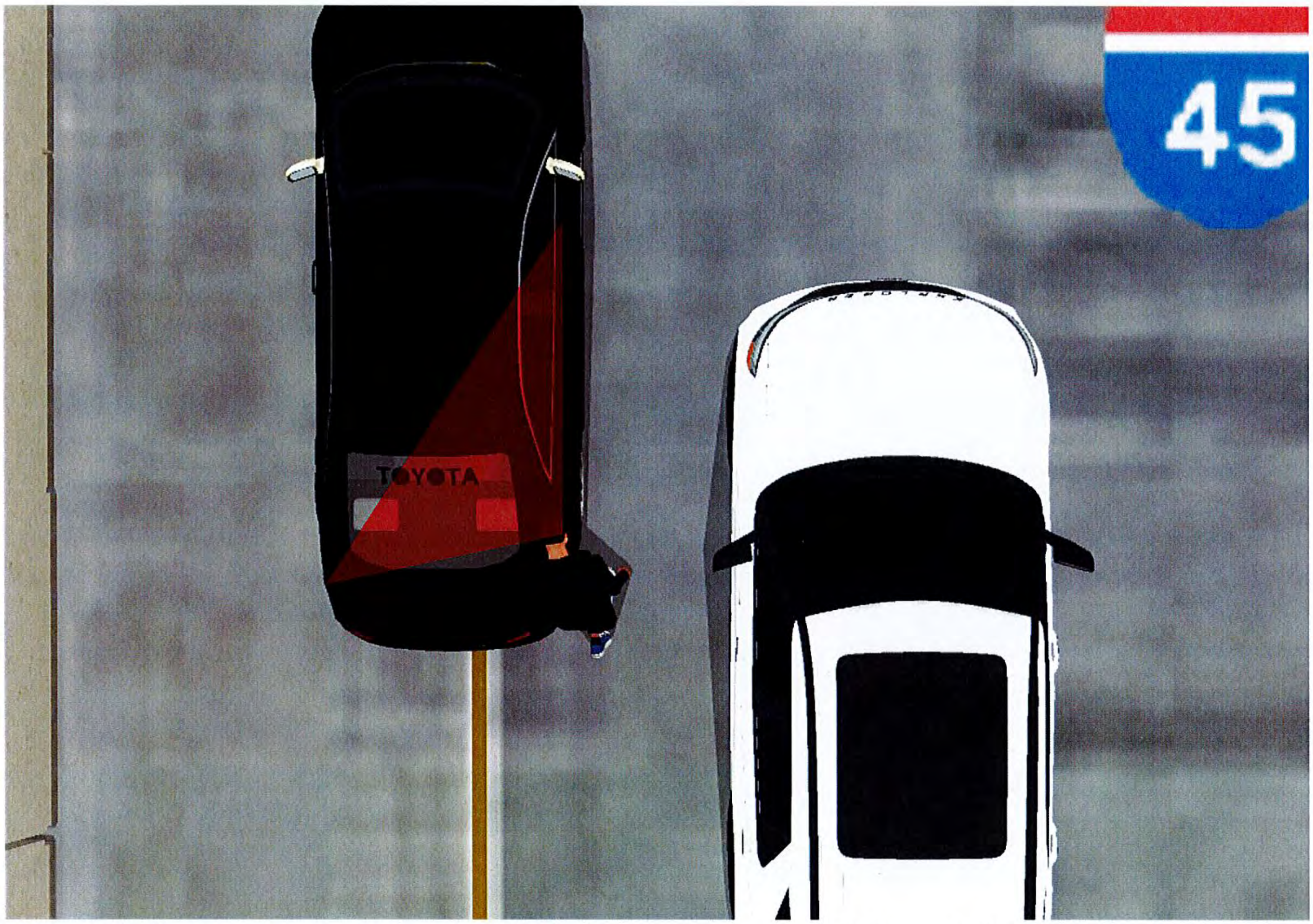


FIGURE 22. Body hit Camry, cone area of blood/tissue.

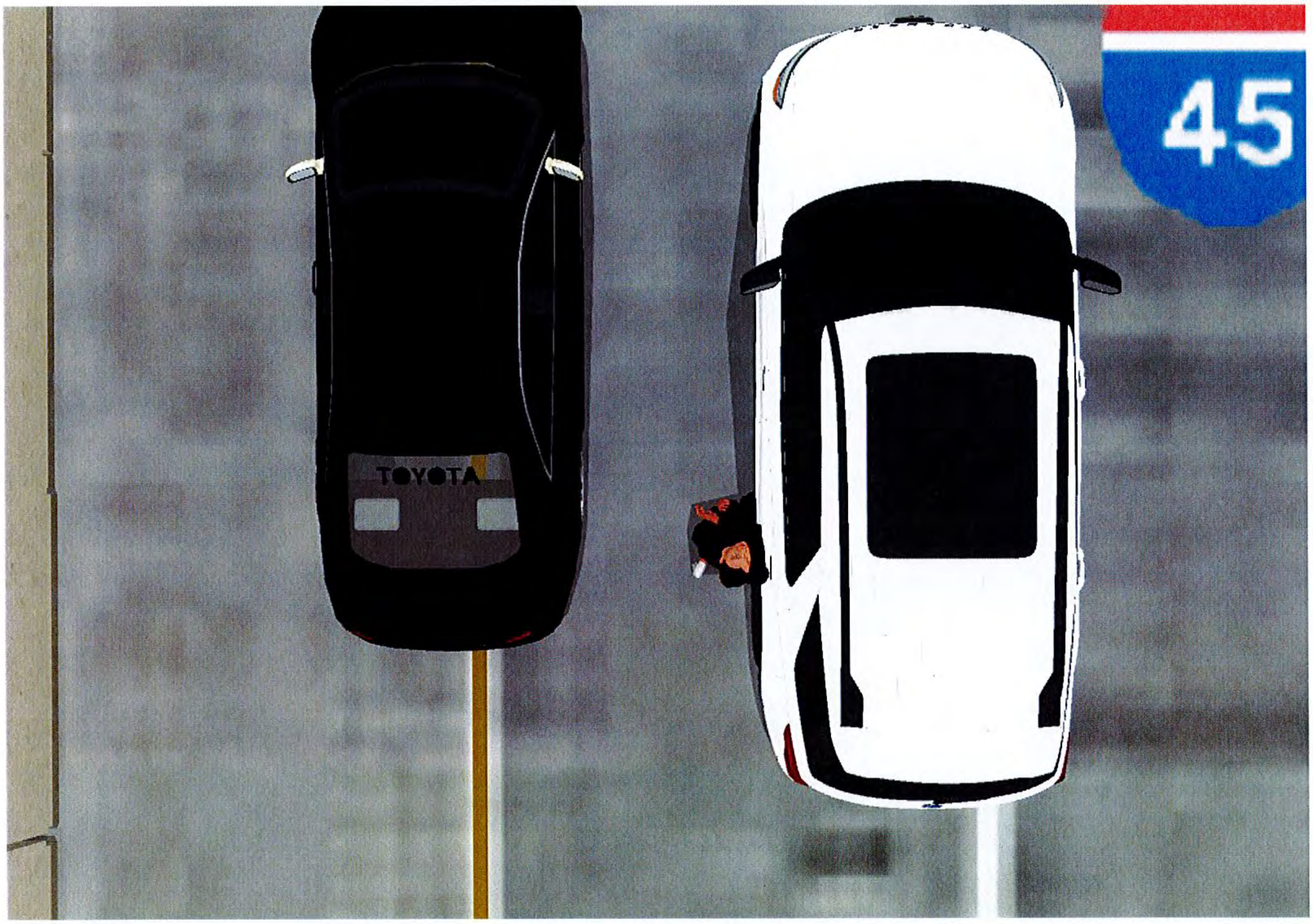


FIGURE 23. Body hit Explorer, blood swipe on Explorer.

FIGURE 24. TX DPS DSC_0011. Blood pool on roadway.

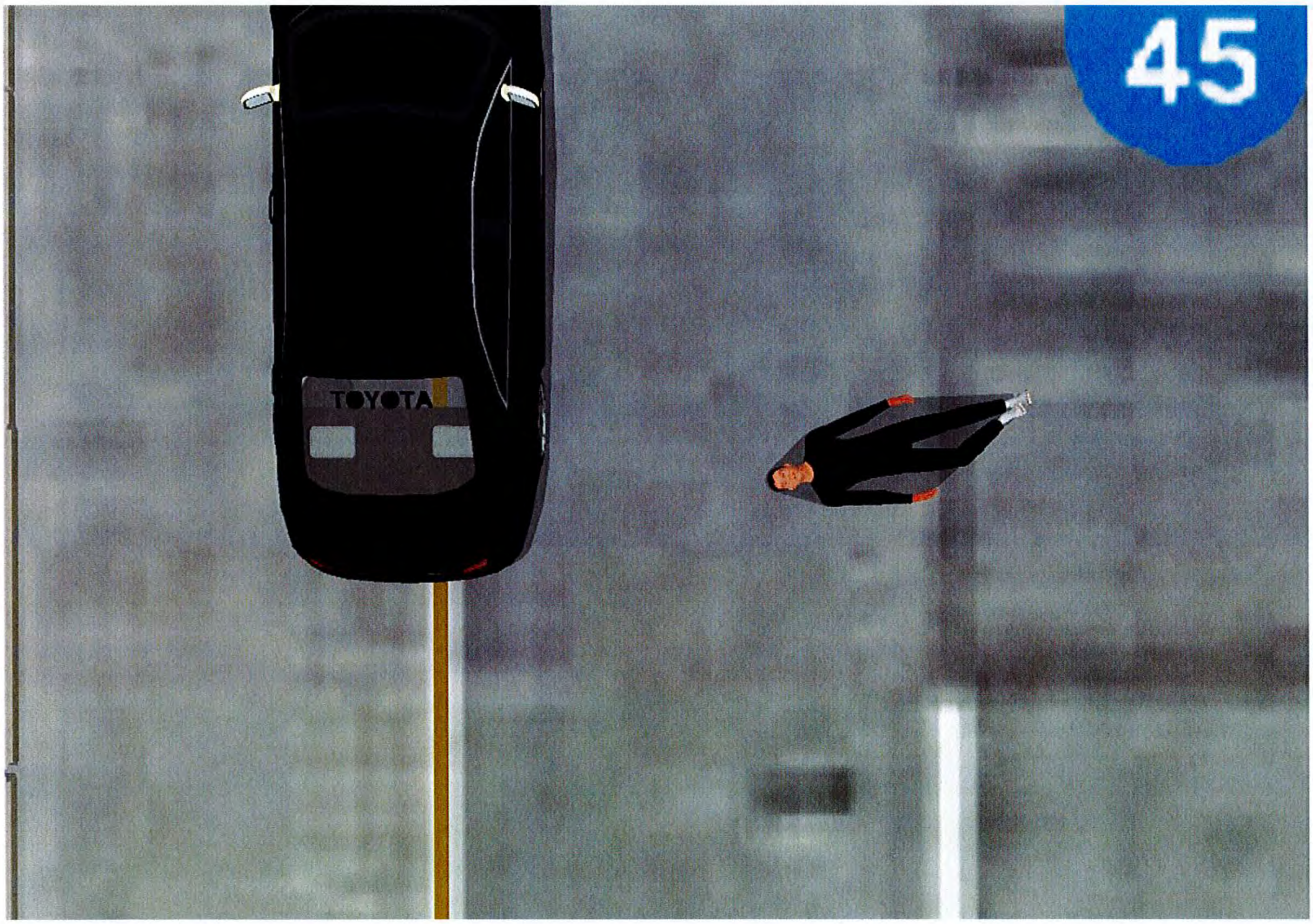


FIGURE 25. Body fell to pavement, blood pooled from head.

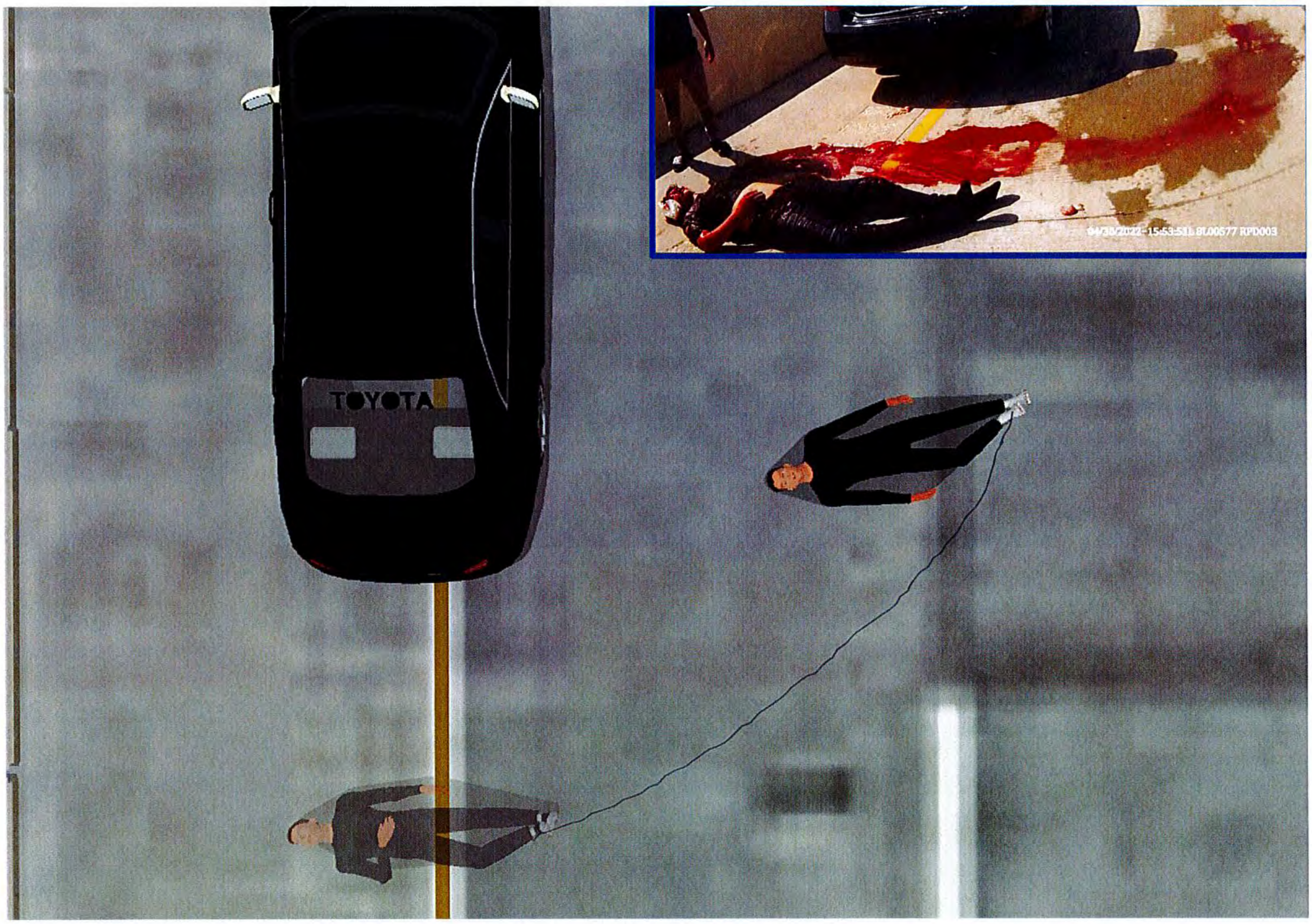
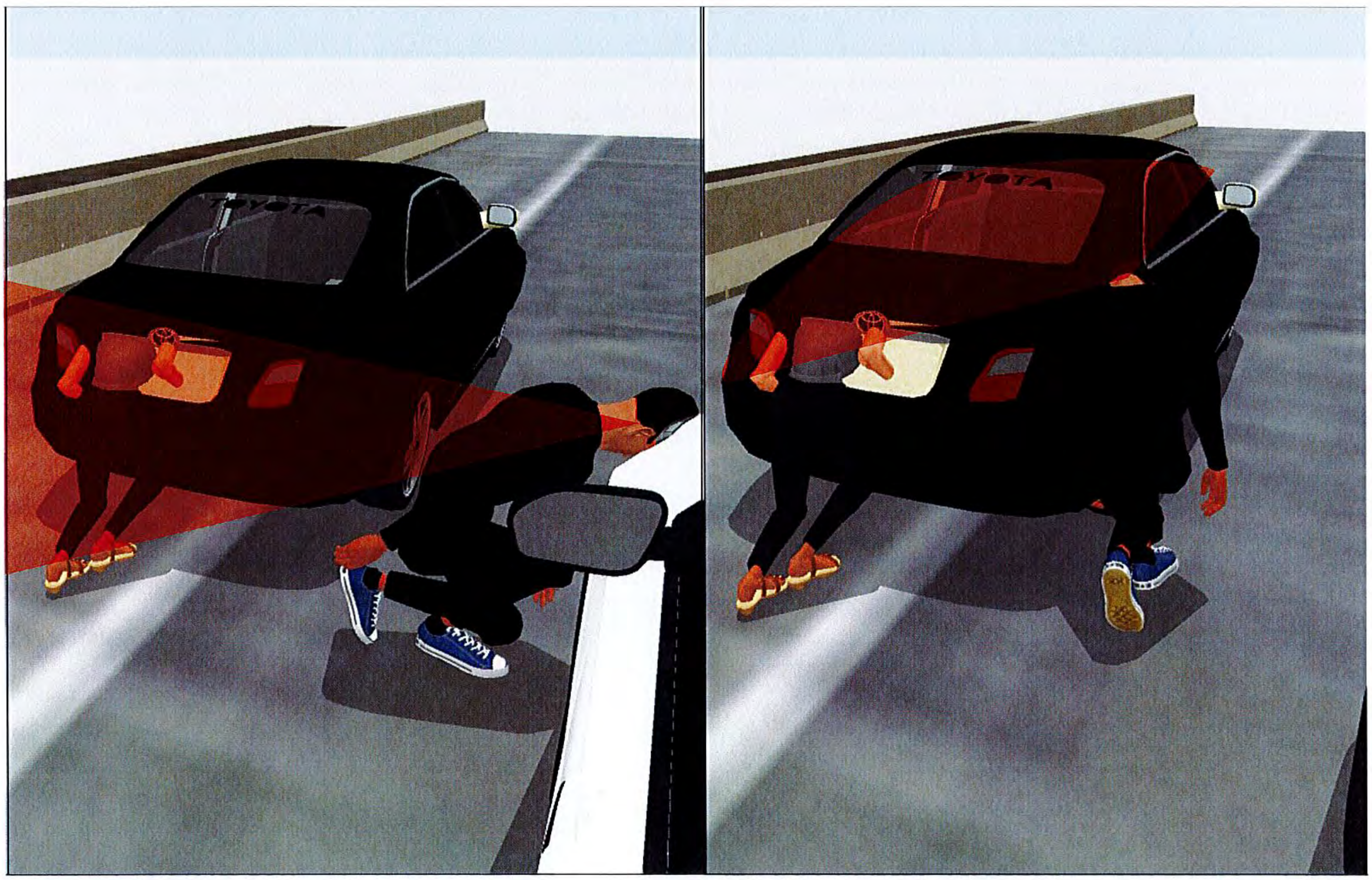


FIGURE 26. Body dragged behind Camry.

FIGURE 27. RPD003_8L00577_164348 8.38.

Blood and tissue spatter on Moreno's right arm and right side.

FIGURE 28. Bodycam images of Evelyn Moreno at scene.

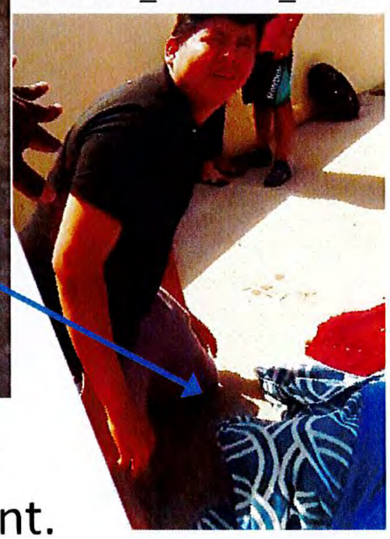


Shaded area indicating approximate path of spatter.

FIGURE 29. Scenarios with Moreno in Camry trunk at impact.

FIGURE 30. Bodycam images of Eric Pivaral at scene.

RPD003_8L00577_160346 02.52



Contact bloodstains below knees
from kneeling on bloody pavement.

FIGURE 31. Bodycam images of Eric Pivaral at scene.

FIGURE 32. Bodycam images of Melvin Diaz at scene.

FIGURE 33. Bodycam images of Dina Regalado at scene.

EXHIBIT G


US Grill